PENCIL POINTS

Volume XI February, 1930 Number 2

DRAFTSMANSHIP AND ARCHITECTURE—6

AS EXEMPLIFIED BY THE WORK OF JOSEPH FREEDLANDER

By Francis S. Swales

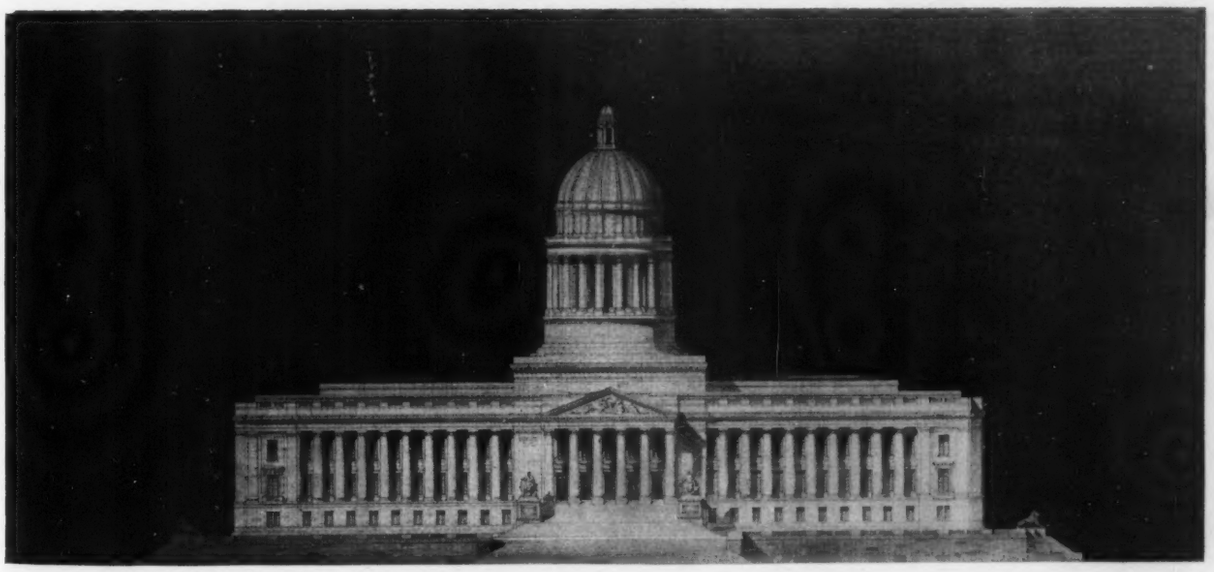
"THE BARON," "J. Henry," "J. H.," and "Freedie" are sobriquets by which he is known among his confrères and camarades, who have broadcast them from Paris and New York.

"Freedie" started student life auspiciously, having but two thoughts as to what he might become: a painter, or, preferably, an architect. Guided by an intelligently interested mother with artistic leanings, he made drawing his hobby during his school days in New York, and entered upon the subject of architecture more seriously by taking the course at the Massachusetts Institute of Technology.

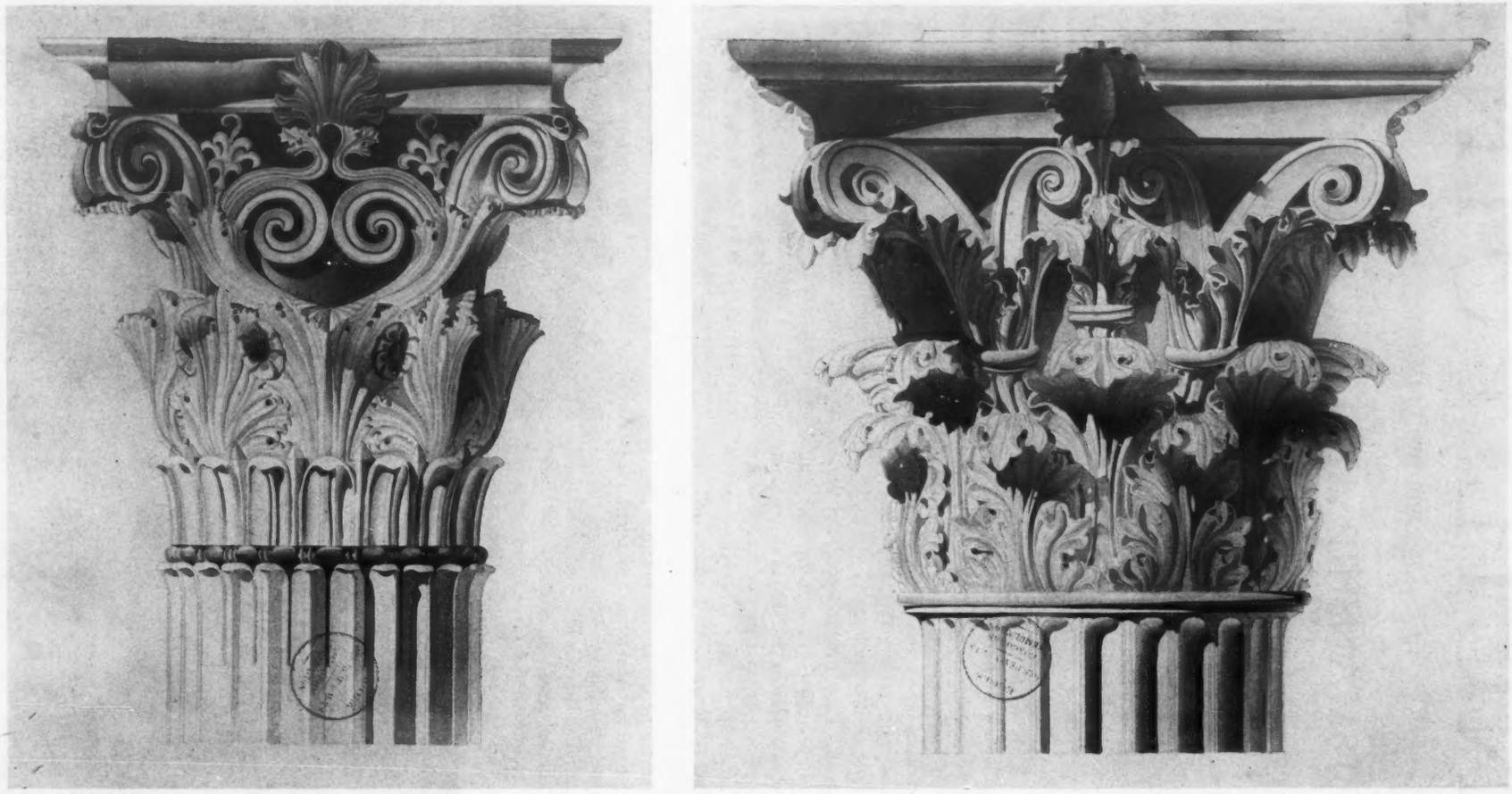
After graduating at "Tech" he followed the usual procedure of the college-course-graduate by obtaining the advice of a good architect in practice as to whether he should enter an office to obtain practical experience or go abroad to continue his studies. He went to Henry Wadsworth ("Waddy") Longfellow, of Boston, for advice and "Waddy" told him to go to Paris and "take the course at the Ecole des Beaux Arts." Up to that time no American had taken "the course." The Ecole des Beaux Arts had been regarded at its face value as the world's foremost school of fine arts; the "liberal arts" or sciences had been considered merely as incidental or collateral subjects. American students had hitherto covered the subjects of mathematics, mechanics, statics, and so on, before going to Paris, and had pursued the practical system of not bothering with the economic side of construction until they entered an office, after obtaining æsthetic training and the philosophic point of view of the great masters in design of architecture of Europe who gave instruction to pupils endeavoring to discover its principles while learning the technique necessary for their expression.

The "course" and diploma at the Ecole seem to have been the outcome of the machinations of those French students, "trying to earn a living" by the practice of architecture or draftsmanship, who sought employment in the Government offices and a means of "proof" of fitness, other than the tangible evidence of their designs, that they were competent to perform at least certain *parts* of the work. It was the invasion by legal establishment of the industrial revolutionists in the field previously held by artists.

For a time, however, perhaps ten to fifteen years, the later effect of this was not apparent. It seemed to create a new stimulus in the students by providing for a preliminary slavish ground work of mathematics and construction, followed by a release to full freedom to pursue design. The display of a galaxy of talent resulted, as evidenced by the designs produced in the

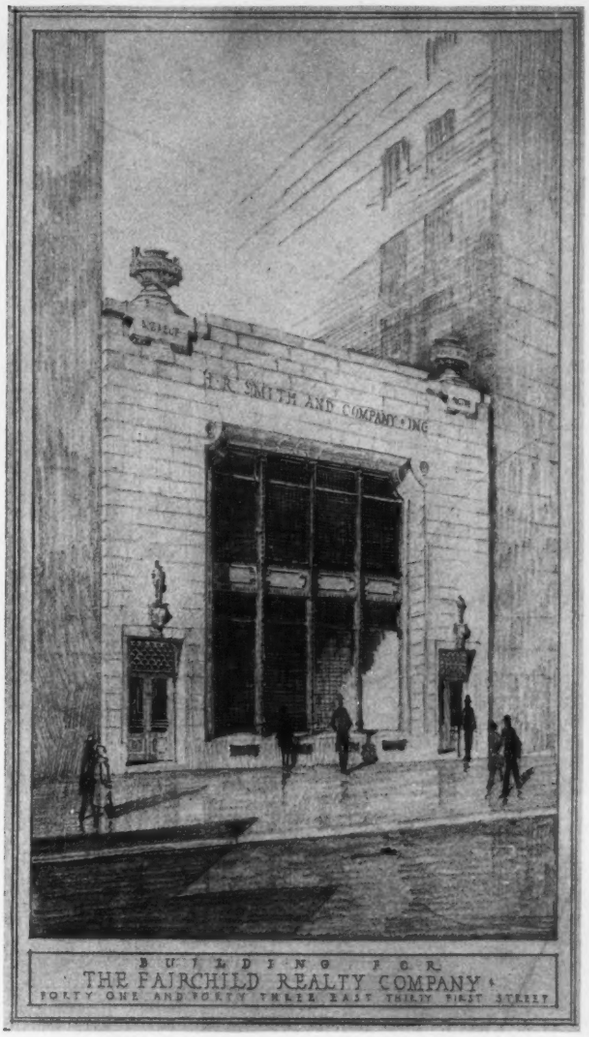


MISSOURI STATE CAPITOL COMPETITION DESIGN BY JOSEPH H. FREEDLANDER AND A. D. SEYMOUR, JR.



TWO GREEK CAPITALS—DRAWN BY JOSEPH FREEDLANDER AS A STUDENT AT THE ECOLE DES BEAUX ARTS

THESE WERE THE FIRST DRAWINGS MADE BY HIM AFTER BEING ADMITTED TO THE ÉCOLE



RENDERING BY J. H. FREEDLANDER
OF HIS DESIGN FOR A SMALL BUSINESS BUILDING

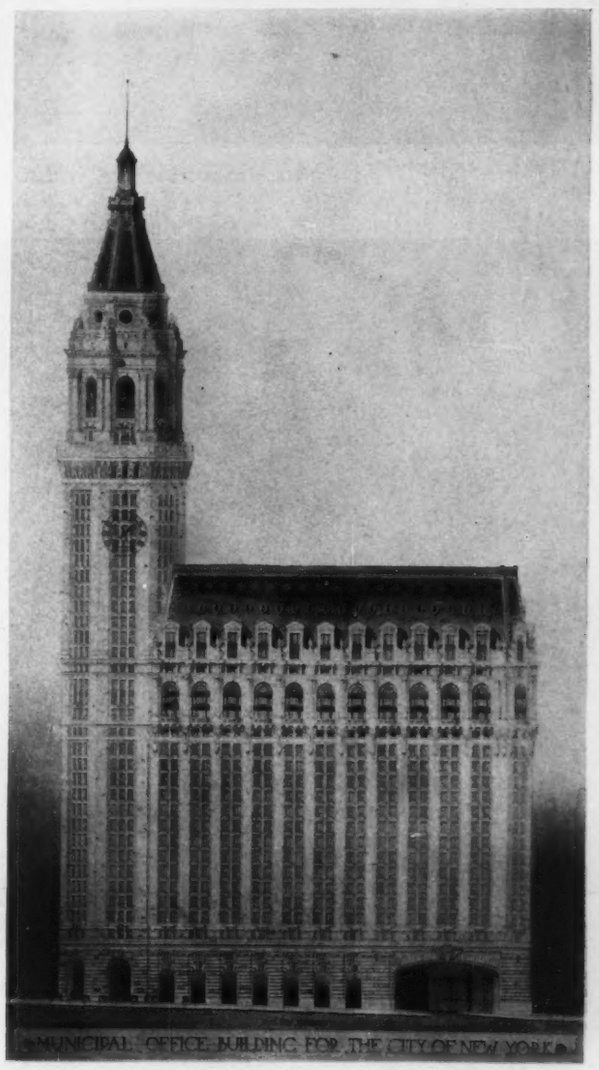
competitions for the *Prix de Rome* during the 'nineties, and some few years afterwards. That period showed remarkable recovery in conception and refinement from the grossness of the preceding period following the régime of Napoleon III, during the 'seventies and 'eighties. More foreign students were attracted to Paris than ever before.

"J. Henry" entered the Ecole on a rising tide of artistic enthusiasm. In the atelier of Daumet-Girault-Esquié he found the brothers Chifflot—the notable Leon Chifflot whose vigor of design and penchant for "log-cabin stonework" interested American students of architecture some time before he won the *Prix de Rome*, and Eugene Chifflot, who later gained second award in the competition for the big prize. Jaussely, another *Prix de Rome* winner, was among the younger students.

"J. H." went through the course and was one of the three first Americans to receive the *Diplôme*. He, John V. Van Pelt, and Herbert D. Hale all graduated at the same time.

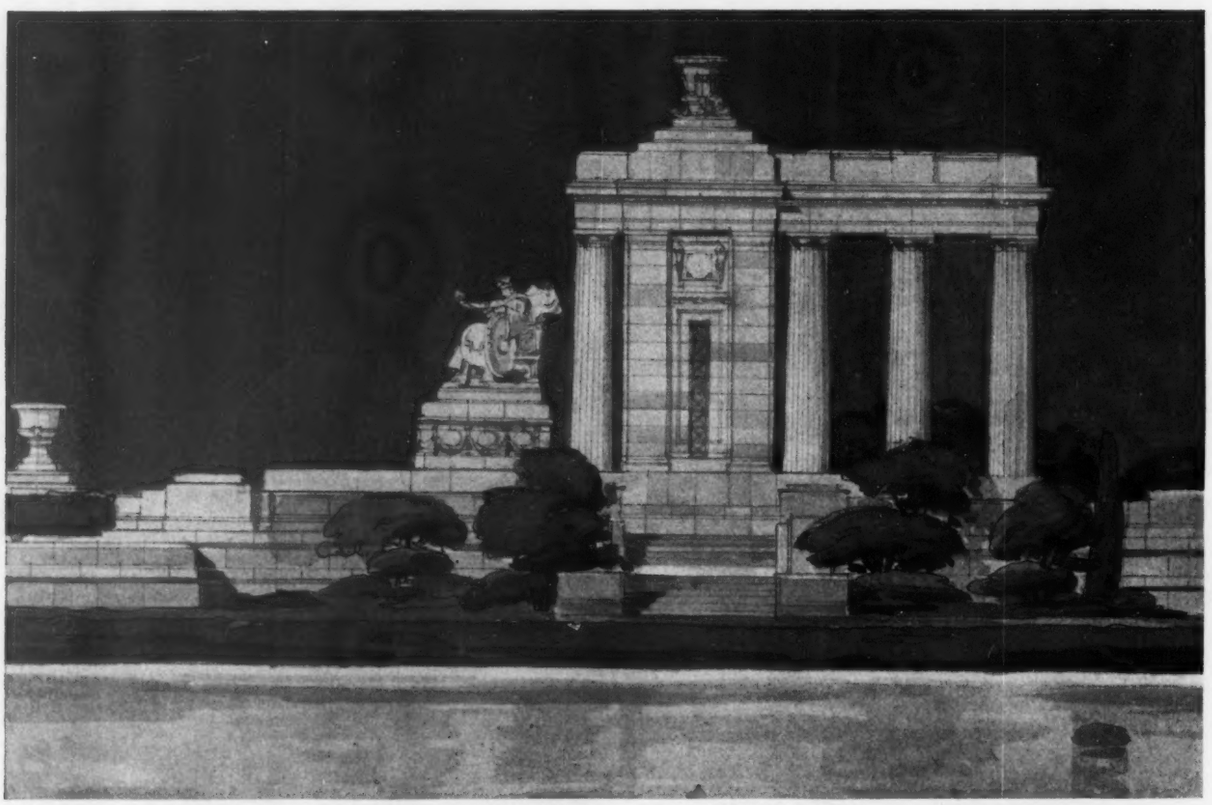
Upon his return to New York young Freedlander spent a few months in an office which was then priding itself upon efficiency, economy, and production. The driving force of the office was a shock to the quietly industrious young man who had been accustomed to the leisurely style of working as a student, with an atelier of his own in Paris. He did not like the rush, so soon established an office of his own on Fifth Avenue, and the Atelier Freedlander for pupils, in East 23rd Street. Among his earliest pupils was George Licht who was the first student to win the Paris Prize founded by the Society of Beaux-Arts Architects.

From his first success, in the competition for the St. Louis Club at St. Louis, Mo., in which he had Mr. Arthur Dillon associated with him, Mr. Freedlander showed an angle of talent which Mr. Egerton Swartwout once remarked upon as an "accurate competition sense." Mr. Freedlander's design was selected in a competition with four well known firms of St. Louis architects. His design appealed immediately to the Jury as well as to the club members. I recall that when I went to St. Louis in 1901 some of the mem-



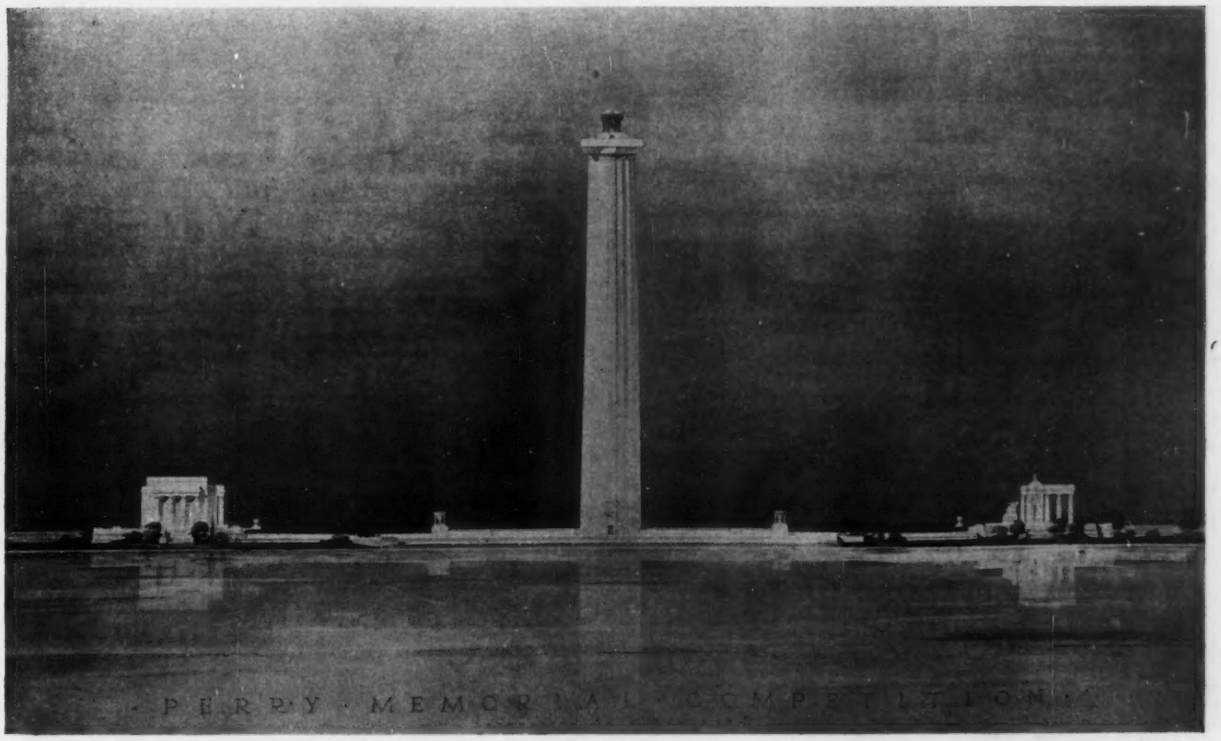
COMPETITION DESIGN BY J. H. FREEDLANDER
MUNICIPAL OFFICE BUILDING FOR THE CITY OF NEW YORK

THE MUSEUM, SHOWN AT THE LEFT IN THE DRAWING OPPOSITE



THE COLONNADE WITH STATUE SYMBOLIC OF DEMOCRACY, SHOWN AT THE RIGHT IN THE DRAWING OPPOSITE

DETAILS REPRODUCED AT THE EXACT SIZE OF THE ORIGINAL DRAWING—
COMPETITION DESIGN FOR PERRY MEMORIAL, BY JOSEPH H. FREEDLANDER AND A. D. SEYMOUR, JR., ARCHITECTS



COMPETITION DESIGN FOR PERRY MEMORIAL—BY JOSEPH H. FREEDLANDER AND A. D. SEYMOUR, JR.

bers of the club were most enthusiastic about the architecture of their new building and I was taken all through it, around it, and across Lindell Boulevard to look at it from every angle. Its many beauties of detail which might have escaped me were energetically pointed out and its architect was lauded after a manner which seemed calculated to make all local architects jealous.

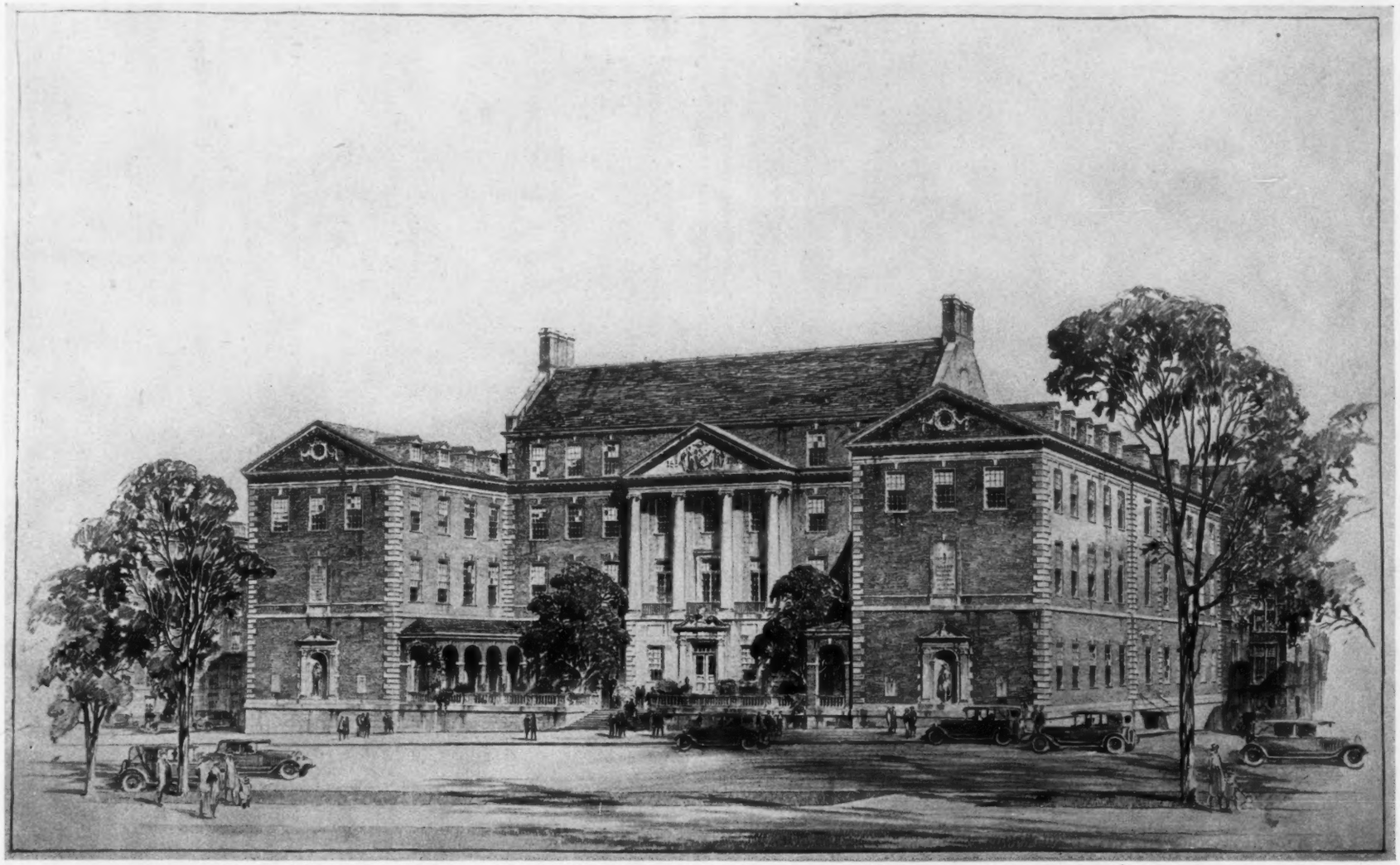
"J. Henry" had previously competed for the University of California and the New York Public Library, making a place in each among those selected in the preliminary "comps" to take part in the final; the design for the library was refined and pleasing. In 1901 he won the competition for the National Soldiers' Home at Johnstown, Tenn., which established his reputation, since from that time on he has had an interesting and varied general practice, mainly in and around New York, including residences, the Harlem Hospital, Importers' and Traders' Bank, and some essays in the competitions for the New Theatre ("Century"), the Municipal Building, and the projected Fulton Memorial on Riverside Park in New York. In 1911 he won the competition for the Auditorium at Portland, Oregon, and the following year, in association with Mr. A. D. Seymour, won the Perry Memorial at Put-in-Bay. It was another instance of that "accurate competition sense."

There were others in and out of the competition who predicted that Freedlander and Seymour would present the winning solution; others as well presented the same idea, but not with the same convincing setting and presentation. Freedlander and Seymour, both in the design of the setting and in the rendering of the drawings, produced an outstanding piece of team work —strong, refined, seriously monumental in quality of design, it was presented in drawings showing a perfect sense of color values.

In the competition for the Missouri State Capitol Building soon afterwards Mr. Freedlander made second place, obtaining special commendation for his elevations; also second honorable mention in the competition for the Department of Commerce at Washington. In 1921 he won the competition of the Fifth Avenue Association for the Signal Towers for regulating traffic on the Avenue, and the next year the competition for the White Plains Municipal Building.

The French Institute in the United States Building, business buildings for the Fairchild Company, and the 340 Madison Avenue Corporation (shown in detail in the September, 1927, issue of PENCIL POINTS) are recent works of excellent design, the two latter being referred to as "modernistic," because—like many of the buildings of the Georgian Period in England!—they are without cornices. They are modern in design in the sense of being fashionable and in good style, but they are free of those contemptible "exterior-inferior-desecrations" which demean nearly all of the buildings dubbed "modernistic." The 340 Madison Avenue Building was given the award of the Gold Medal of the Fifth Avenue Association last year.

Freedlander's design for the improvement of Bryant Park made last year encourages hope that it may be duly executed, and his civic plans for the improvement of Riverside Park from 88th to 103rd Street and Boating Center at 79th Street, produced this year, and his design which won the competition for the



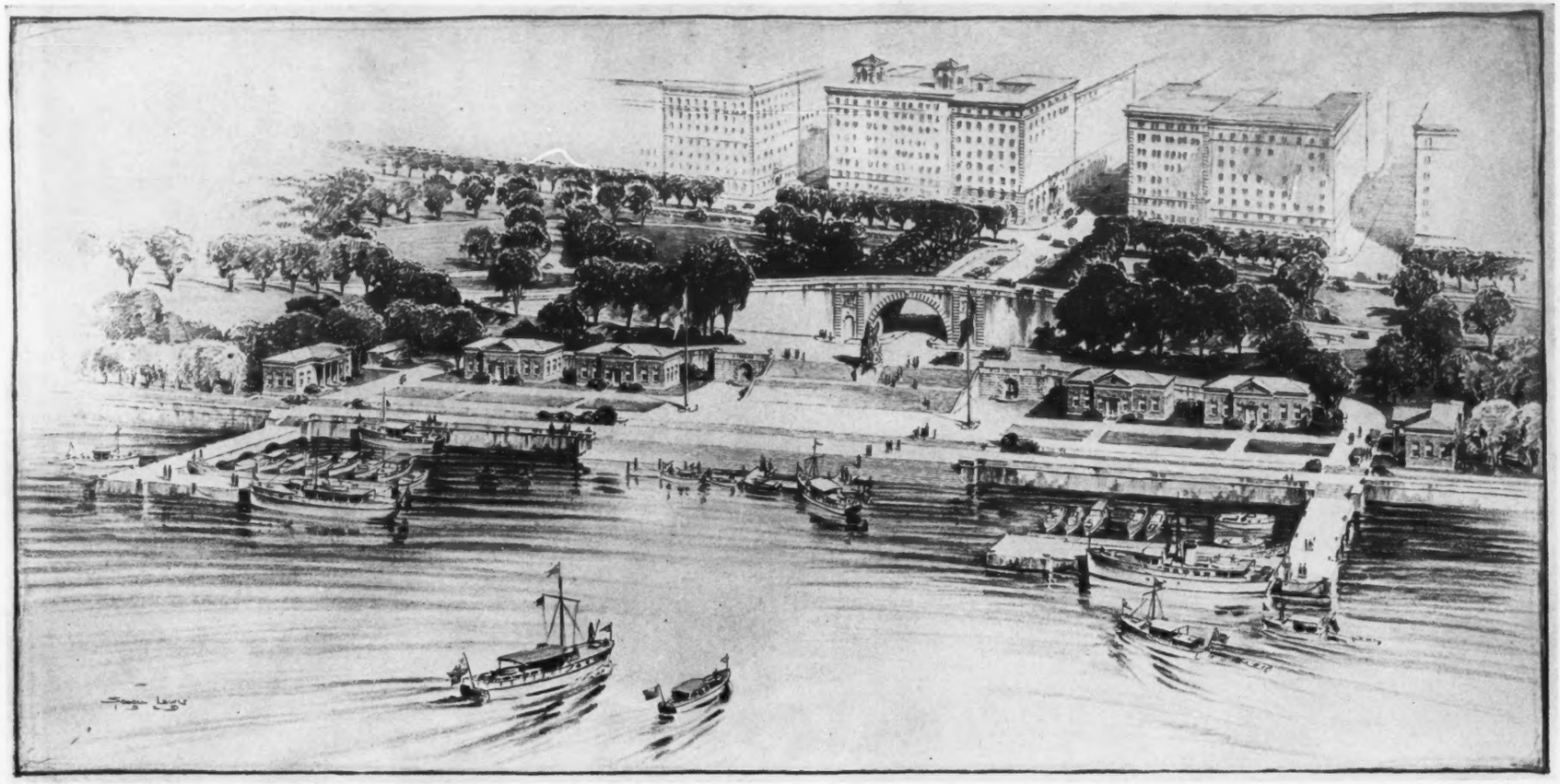
SUCCESSFUL COMPETITION DESIGN FOR MUSEUM OF THE CITY OF NEW YORK—JOSEPH H. FREEDLANDER, ARCHITECT

FROM A RENDERING BY SCHELL LEWIS

PERSPECTIVE OF COLONNADE—FROM A COLOR RENDERING BY OTTO R. EGGERS

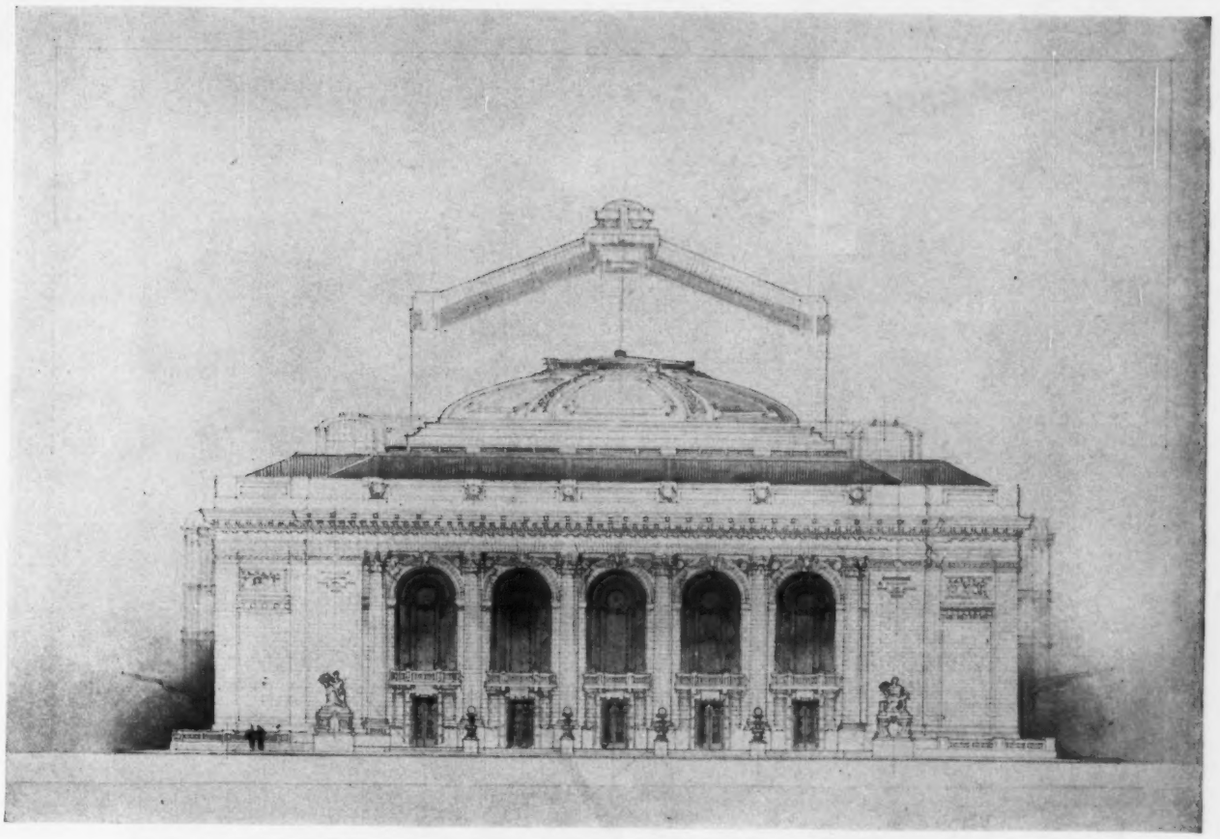
PERSPECTIVE OF THE MUSEUM—FROM A COLOR RENDERING BY OTTO R. EGGERS

DETAILS OF COMPETITION DESIGN FOR PERRY MEMORIAL—
JOSEPH H. FREEDLANDER AND A. D. SEYMOUR, JR., ARCHITECTS



PROPOSED TREATMENT OF BOATING CENTER, RIVERSIDE DRIVE AT SEVENTY-NINTH STREET, NEW YORK

JOSEPH FREEDLANDER, ARCHITECT—RENDERING BY SCHELL LEWIS

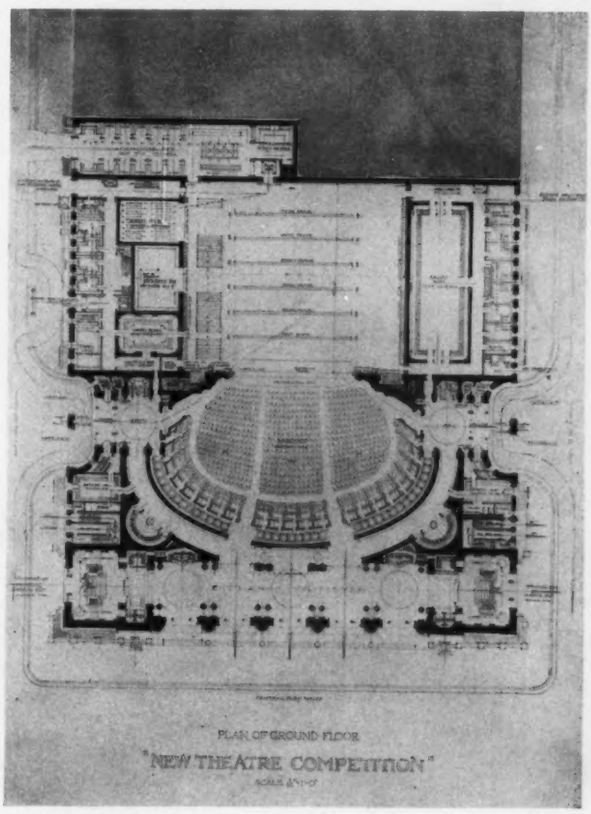


COMPETITION DESIGN FOR NEW THEATRE, NEW YORK—J. H. FREEDLANDER, ARCHITECT

Museum of the City of New York last spring, strike a satisfying note in the thought that this architect with the "accurate competition sense" is probably reflecting the ideas of the people of New York of today. If so, we are finding a safe return to a sound, sensible type of architectural design.

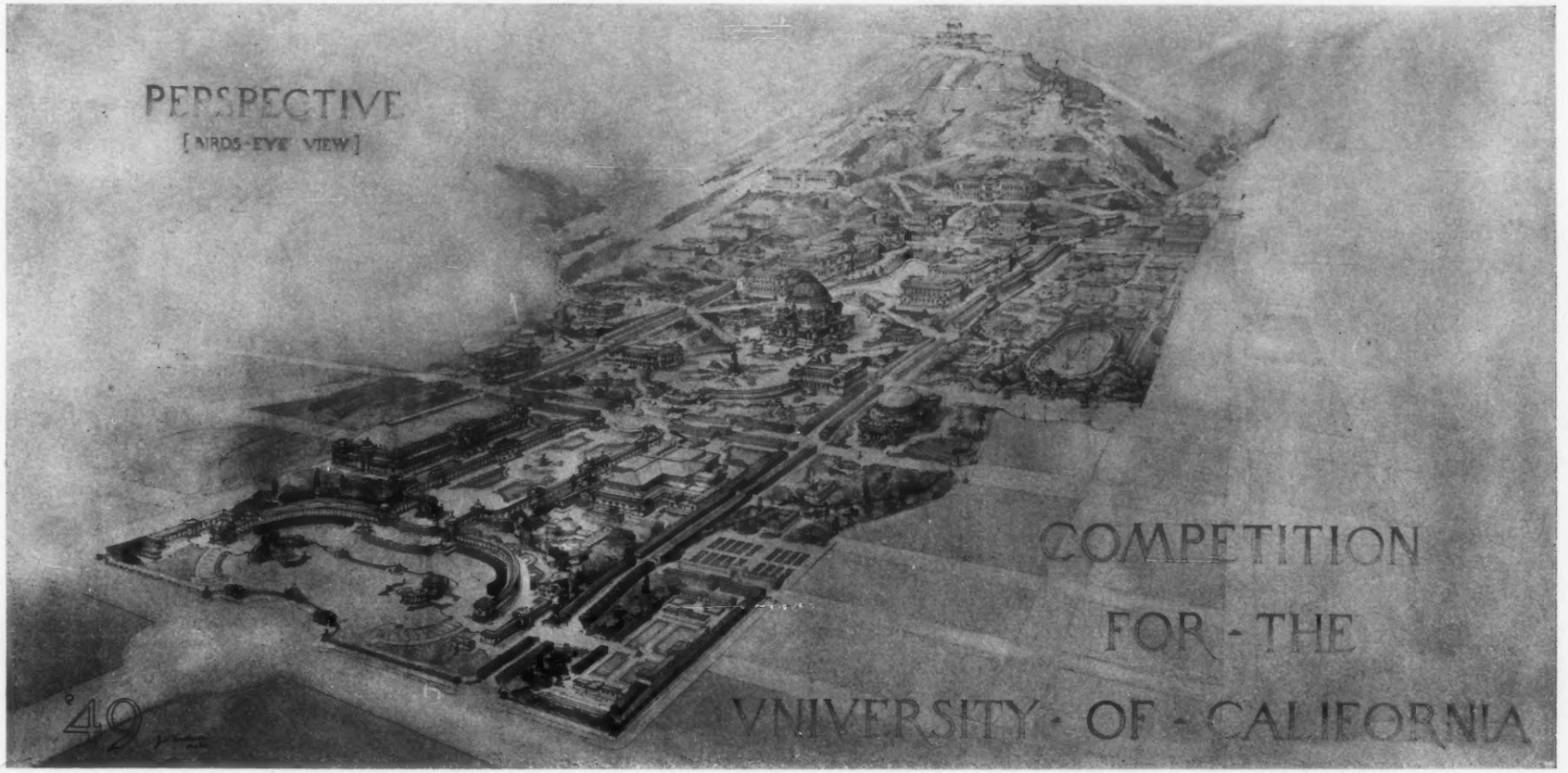
All of Mr. Freedlander's architectural drawings are consistently clear and well made, showing a pronounced preference for transparent shadows in rendering.

He has long taken an active part in the work of societies of architects and other artists, and in the production of the annual Beaux-Arts Ball of the Society of Beaux-Arts Architects, and is a member of most of the well known societies. He is President of the Federation of Fine Arts of the City of New York, Chevalier of the Legion of Honor of France, Vice President of *L'Union des Arts*, Trustee of the Museum of French Art, and former President of the *Société des Architectes Diplômés par le Gouvernement Français*, Member of the Jury of Awards of the Fifth Avenue Association, and so on.



PLAN OF COMPETITION DESIGN FOR NEW THEATRE

Whether he wins, loses, or draws, he loves to enter competitions — perhaps that is one of the most valuable sporting traits developed by the Paris training in design—and since he has won more often than lost, it appears to have been profitable sport. It has also broadened the field of his practice preventing it from



PERSPECTIVE OF DESIGN SUBMITTED BY JOSEPH H. FREEDLANDER IN THE COMPETITION FOR THE UNIVERSITY OF CALIFORNIA

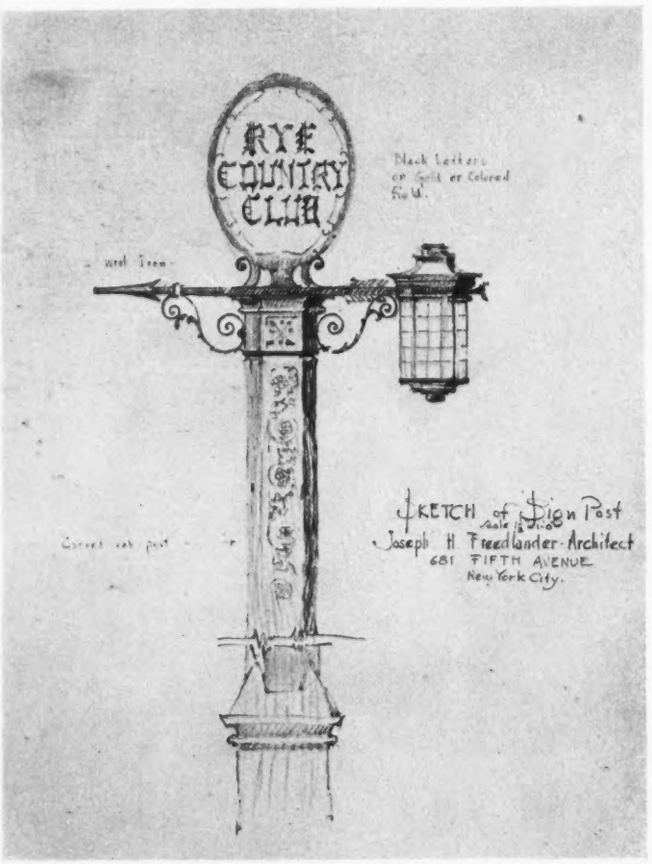
(An international competition was first held and from the designs submitted in this, ten architects were invited to compete in a second competition. Mr. Freedlander was among those selected and this drawing shows his design submitted for the final competition.)

PROPOSED TREATMENT OF THE ENTRANCE TO THE NEW SPEEDWAY—RIVERSIDE DRIVE AT SEVENTY-SECOND STREET, NEW YORK

JOSEPH H. FREEDLANDER, ARCHITECT—FROM A PENCIL RENDERING BY SCHELL LEWIS

getting into any "specialized" rut. Variety of subject which has characterized Freedlander's work is one of the greatest needs in current American architectural practices, in order to prevent the dull mechanical products of "standardization of pattern" from becoming the substitutes of design.

I believe that no really first class architect—which means one who is essentially an artist, and whose other capacities and knowledge are at least equal to those of any of his competitors—would willingly specialize in any particular class of buildings, and that every special class of buildings, such as the factory, monument, public school, hospital, etc., would be better in practical plan, as well as in appearance, if they were designed by architects whose experience is varied and point of view continually refreshed by change of subject, rather than by "specialists" bettered by too much knowledge of rules, and without the force of character necessary to get such rules changed to enable progress. The outstanding qualities of "Freedie's" architecture is its freedom from slavishness and its growth. It seems to me that his "latest" work has nearly always been his best.



DESIGN BY JOSEPH H. FREEDLANDER FOR A SIGN POST
FROM A RENDERING BY ROBERT VON EZDORF

DESIGN IN MODERN ARCHITECTURE

II—THE MODERN PLAN

By John F. Harbeson

"To make a plan is to determine and fix ideas.

"It is to have had ideas.

"It is so to order these ideas that they become intelligible, capable of execution, and communicable. It is essential therefore to exhibit a precise intention, and to have had ideas in order to be able to furnish oneself with an intention. A plan is to some extent a summary, like an analytical contents table. In a form so condensed that it seems as clear as crystal and like a geometrical figure, it contains an enormous quantity of ideas and the impulse of an intention." LE CORBUSIER: *Towards a New Architecture.*

"Pour l'architecte toute construction doit être d'abord un plan. Le profane, lui, y voit surtout une forme, et c'est elle qu'il juge: en effet la construction achevée, c'est la forme extérieure qui s'offre aux regards. Le plan n'intéresse plus alors que les habitants de l'immeuble: eux seuls auront à souffrir de la maladresse de l'architecte ou bénéficieront, au contraire, de son ingéniosité, au lieu que la forme satisfait ou scandalise tout le monde." JEAN PORCHER: *La Forme Architecturale Décorative.*
L'Architecte 1928. p. 57.

With the exception of the few problems that are principally decorative in character, it is in the plan that solution of a program is most clearly shown. The program has been defined as "the sum total of services that are expected from a building, not only in meeting practical demands, but also in satisfying those of taste; for it is by no means sufficient for an architecture to furnish places adapted to their uses (a narrow point of view too often taken by the engineer), but to do this in such wise that these places shall by their appearance produce in the spectator a certain state of mind." * As we have said (PENCIL POINTS, January), the architectural programs of today, corresponding to an advanced civilization, are much more complex than those of the past; the plans of modern architecture, in general, reflect this complication.

While most contemporary programs are those that are new with our own time, such as airports, or are such as are so modified by the time that they may be said to belong to it, such as the railroad terminal, a few represent a normal evolution of old types of edifice not fundamentally changed by modern conditions. This group would include churches and dwellings and, to a lesser extent, theatres, courts, stone bridges, and memorial monuments.

The ritual of the church has not changed greatly with time: the principal requirement is still a large room where many may gather, so devised as to awaken religious ideas in those who do so. But while the program has developed little, the new constructive processes allow of an entirely new conception of religious architecture. Still retaining the vertical lines that have become associated with aspiration, and the relatively great height of room that has come to express the idea of church, the thick walls and heavy buttresses are now replaced by a thin section of reinforced concrete, or made of steel construction with thin spandrel walls. Compare the thin walls of the church of Elisabethville with the heavy stone walls of a medieval church or of a modern church done in the medieval manner. This church is of reinforced concrete (the work of Paul Tournon, who fifteen years ago was one of the brilliant students at the Ecole des Beaux Arts), as is the church at Raincy (page 9, January PENCIL POINTS).

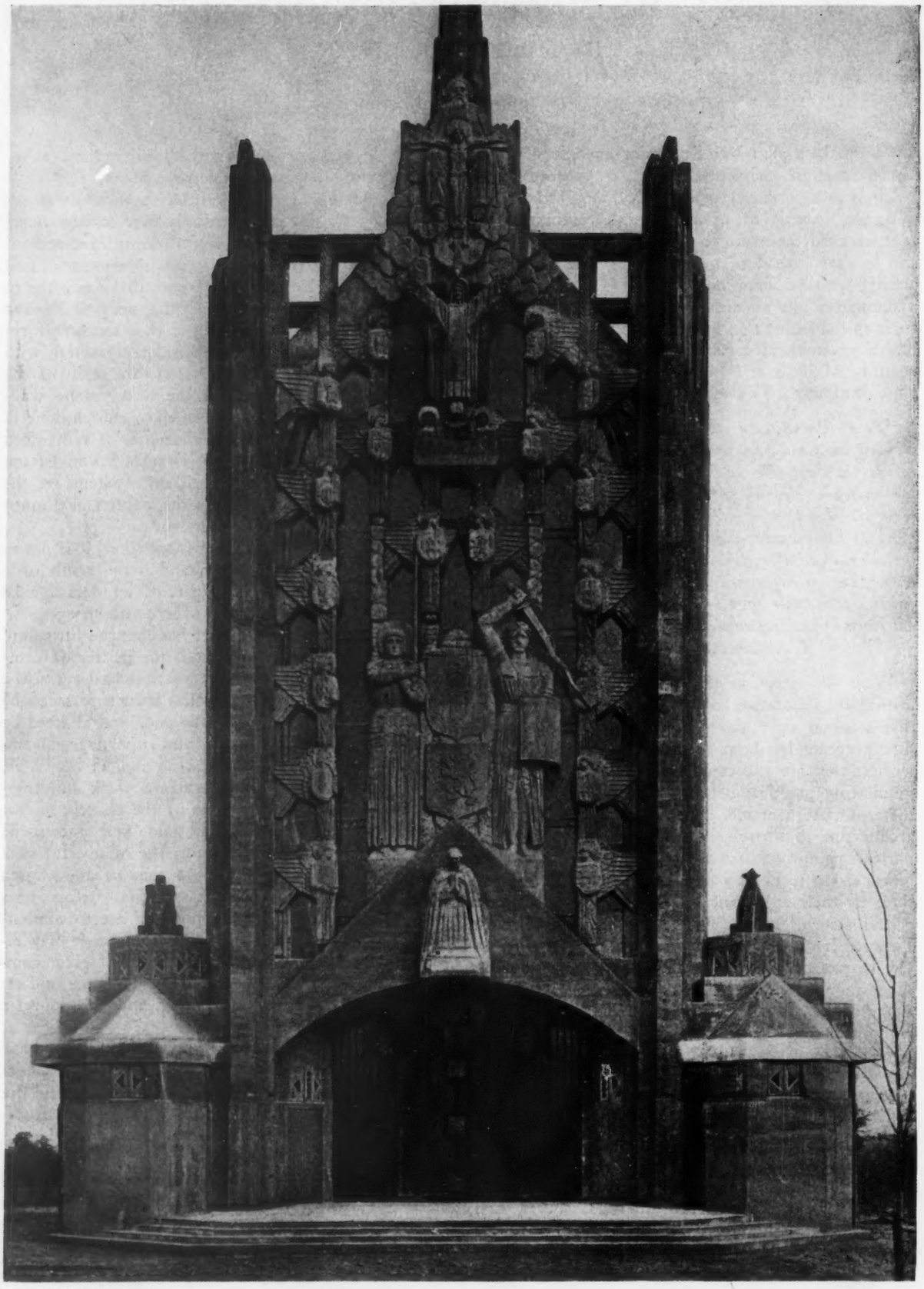
While the change in *poché* is startling, it is not as sudden as one might suppose, and is the result of a rather usual atttitude on the part of builders to take advantage of the development of structural progress.**

But though the church itself has changed little, and the room for worship, except in the matter of comfort, is much as it has been for a hundred years, the church as a seat of learning has been superseded by the schools, as a refuge for the poor and afflicted by the modern hospital, asylum, and orphanage, and as a center of social life by the club and Y. M. C. A. There are attempts to add welfare work and community service to the activities of the church, so that assembly rooms, gymnasia, and game and other social rooms are added to the program; the number of such buildings is small compared to that of the church simply as church. The most startling attempts at a new solution of the church problem are to combine the church with an office building so that it may remain in an old location now become of great commercial value. The two ideas of commerce and religion do not mix easily, however, and it is doubtful if this type will persist.

The home of a hundred years ago in many cases was not only a residence for a family, but was also the place for its recreation, entertainment, and for the care of the sick. These are now almost entirely cared for in specialized buildings. As a residence, the home of the well-to-do has changed only in the attainment today of greater privacy, due to the use of corridors and of individual bathrooms, and in comfort, due to the inventions and improvement in the use of electricity for lighting, refrigerating, cooling,

*"*The program then involves not only a list of the accommodations required, but the sentiment with which their architecture must be studied, the 'character' of this architecture." PAUL CRET in "Significance of the Fine Arts." p. 222.*

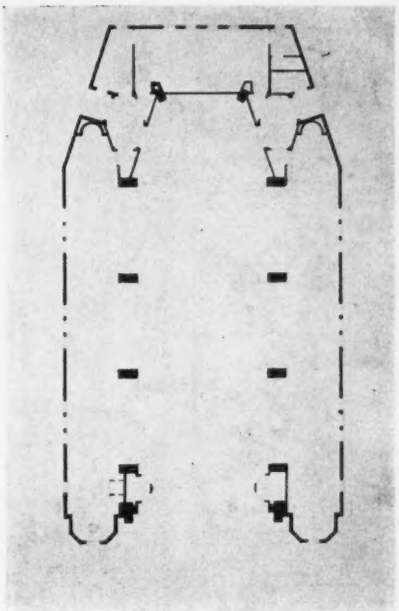
***"The most remarkable feature about the Pantheon (Paris, 1759-90, Soufflot, Architect) is the boldness of its construction. A comparison of its plan with that of other domed churches shows that the area covered by walls and piers is smaller relatively to the voids than is usual." W. H. WARD, the "Architecture of the Renaissance in France."*



From "L'Architecture"

CHURCH AT ELISABETHVILLE, FRANCE—PAUL TOURNON, ARCHITECT, SARRABEZOLLES, SCULPTOR

The success of the general treatment of the upper part of the façade makes the lower portion seem inadequate and crude. The handling of the sculpture, conventionalized in the modern manner, is yet in the spirit of the problem. The piercings in geometrical shapes at the bottom, and the door treatment are not, but seem, utilitarian and unsatisfying.



PLAN OF CHURCH AT ELISABETHVILLE

PAUL TOURNON, ARCHITECT

Note the extremely thin poché of the enveloping walls, the smallness of the piers. Twenty years ago such construction would not have been possible; naturally there are practically no reveals except at the extreme, where the doors are pushed back for other than structural reasons.

and for signal systems, in the use of gas for cooking, and of steam or vapor for heating.

Recreation today is now provided in the theatre, — an old program brought up to date — in the stadium (little changed fundamentally since the days of the Romans), and the athletic field, ball park, the amusement park, and the moving picture house, all essentially programs of today —modern architecture — which at first were clothed in classic forms, but are now more and more frankly modern in expression because steel and concrete lend themselves naturally to this simpler modern expression.

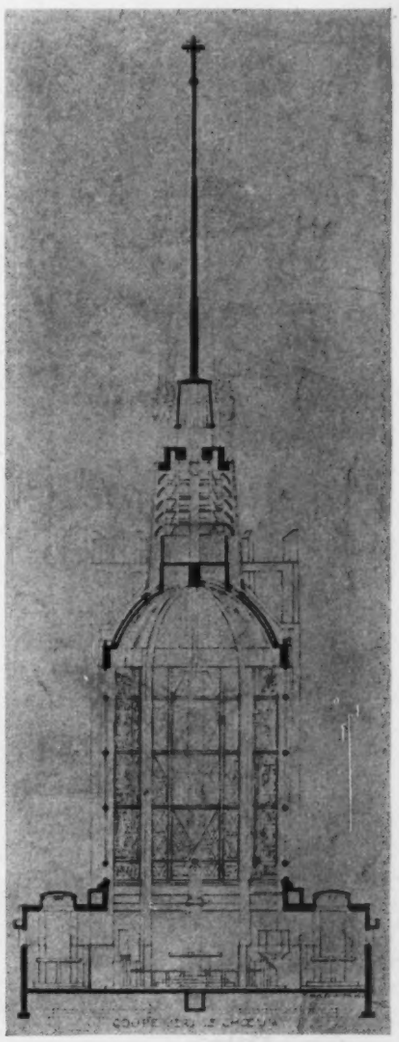
The sick and dependent are seldom left at home, but are sent to hospitals, sanatoria, orphanages. This is true of all classes of society. The modern citizen, poor or wealthy, is born in the maternity ward of a hospital, and goes to the hospital for almost all ills that take him off his feet. Naturally the hospital has had a great deal of attention: it has been standardized and perfected by the collaboration of physicians and architects. Height and air having been found to influence greatly the physical as well as mental state of the patient, the orientation of the rooms is a very important factor. Some of the attempts to make the best possible use of site and exposure have led to new forms in architecture. The projected sanatorium of Plaine-Joux-Mont-Blanc is such a one, with the greater part of the rooms having cross ventilation, and with two sides facing the southern exposure: along the north side of the building are grouped the service and minor rooms.

The façade which results from such an idea in plan is naturally more complex, more restless, than one with a continuous front wall, but need not, for that reason, be less beautiful. It is in this way that the plan—the program—forms what is distinctly "modern" architecture, entirely aside from modern decoration, which we shall look at later. Le Corbusier does not greatly overstate the fact when he says "the plan is what determines everything; it is the decisive moment."

While the individual house has changed little in program, modern society has created new forms of home—the apartment house, and the hotel, quite different from the inn of history, or the hotel of even twenty-five years ago. This is a democratic age, and the contribution of modern architecture to the forms of that art is the building for common use, to live in, to work in, to study in, and to be amused in.

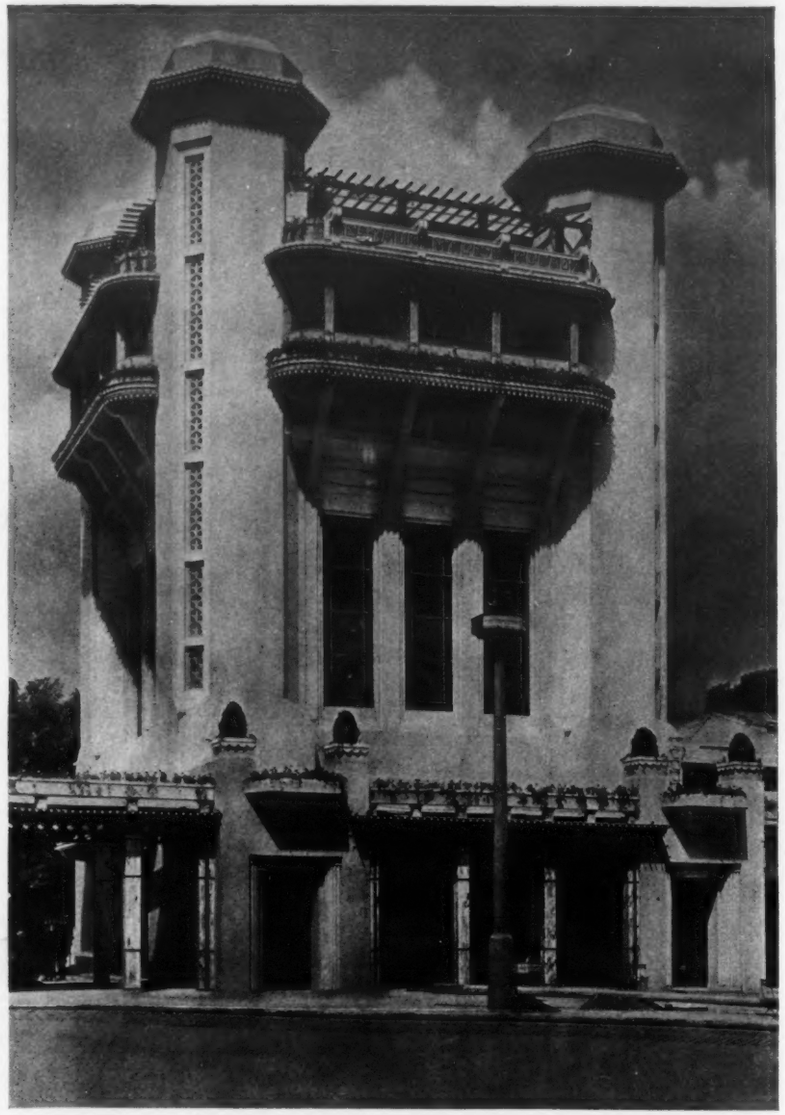
The hotel is a many storied building, as all city buildings must be because of the high cost of land, and its greatest revenue comes from the individual patrons; there must be many rooms—one thousand or more—and these must be comfortable without being large, and each must have its bathroom. The study of a hotel, therefore, starts with the typical bedroom floor, and when that is satisfactory the bottom and top are studied to work with it.

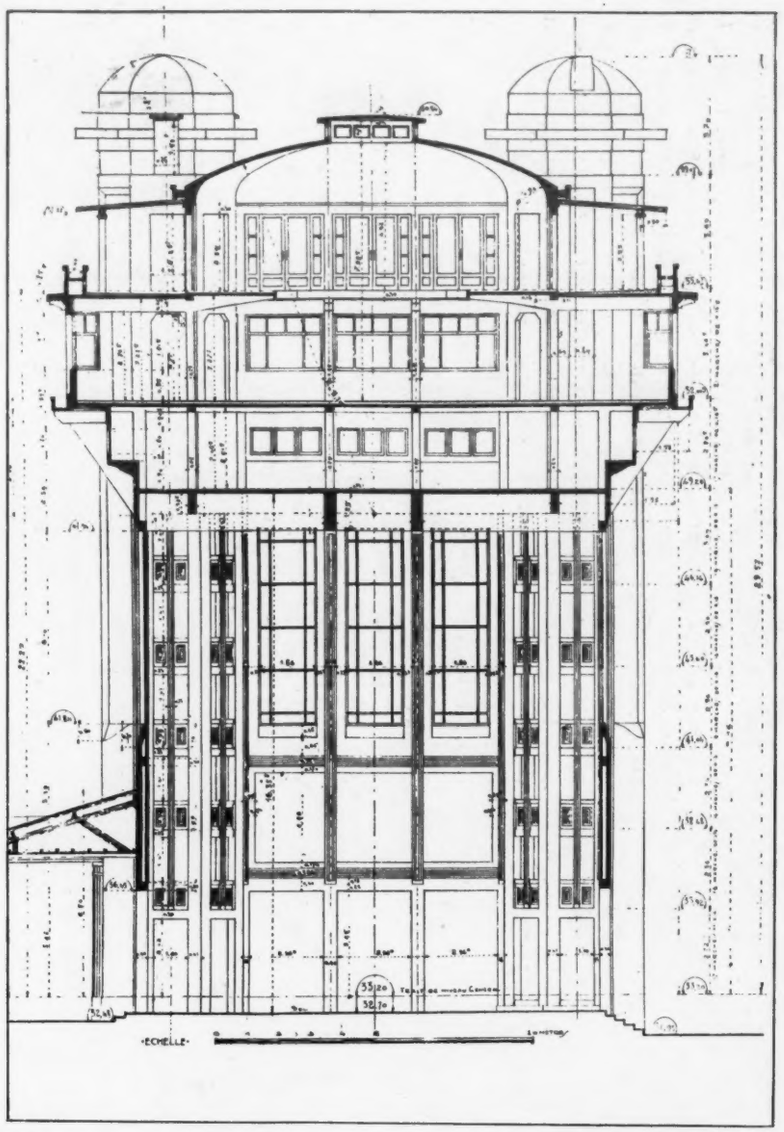
The museum for many years was simply a convenient palace; when the Boston Museum sent its architects to study museums in Europe they reported that the best museums were just such old buildings turned to a new purpose, as the Carnavalet in Paris, and the Pitti in Florence. Perhaps because there works of art had the kind of background they were originally created for. But in this country there were no old palaces. After some attempts to make museums that were storehouses for art objects —the rooms usually gloomy because lighted only from above—modern architects (in this country and Europe), have evolved the modern museum, of which the Cardinal



TRANSVERSE SECTION OF CHURCH AT ELISABETHVILLE

Note the proportion of the nave, high as we are accustomed to expect in a church, but here enveloped in reinforced concrete of minimum section.





TOWER ON THE ESPLANADE DES INVALIDES, EXPOSITION OF DECORATIVE ARTS, PARIS, 1925—CH. PLUMET, ARCHITECT.

A building of very thin reinforced concrete construction which does not show on the exterior, unfortunately, for it is solid-looking and heavy. Here is a "Restaurant in the Air" as called for in a recent Class A program of the Beaux-Arts Institute of Design. The large brackets supporting the restaurant balcony are among the new forms introduced by concrete construction. The thinness of the reinforced concrete construction is shown by the section at the right. So many things that formerly could not have been built are now possible; it is quite likely that many new forms will be added to the vocabulary of the architect.

PAVILION OF LYON AND ST. ÉTIENNE, PARIS EXPOSITION, 1925—TONY GARNIER, ARCHITECT

Garnier, one of the forerunners of the French architecture of the new school, uses no "useless" cornices, mouldings, or other projections, and practically no ornament. The lower portion is a quite interesting study in proportion, and the exposition character is obtained with very simple means. The lantern, without the same simplicity of wall surface, is not so pleasing.

principles are: as many side-lighted rooms as possible, a selected showing of exhibits (all others being classified in storage rooms), and where possible, a progressive chronological arrangement of historical exhibits. The museum at Darmstadt is one such; the Art Institute at Detroit another.

The school is an old problem. The "modern" school is the result of an evolution toward perfection —so many having been built in this age of universal education—with wide corridors, classrooms lighted from one side only, with assembly room, shop, and gymnasium, all with high ceilings to ensure ventilation. The library is another old program, its development being most marked in the stack room for the storage of books.

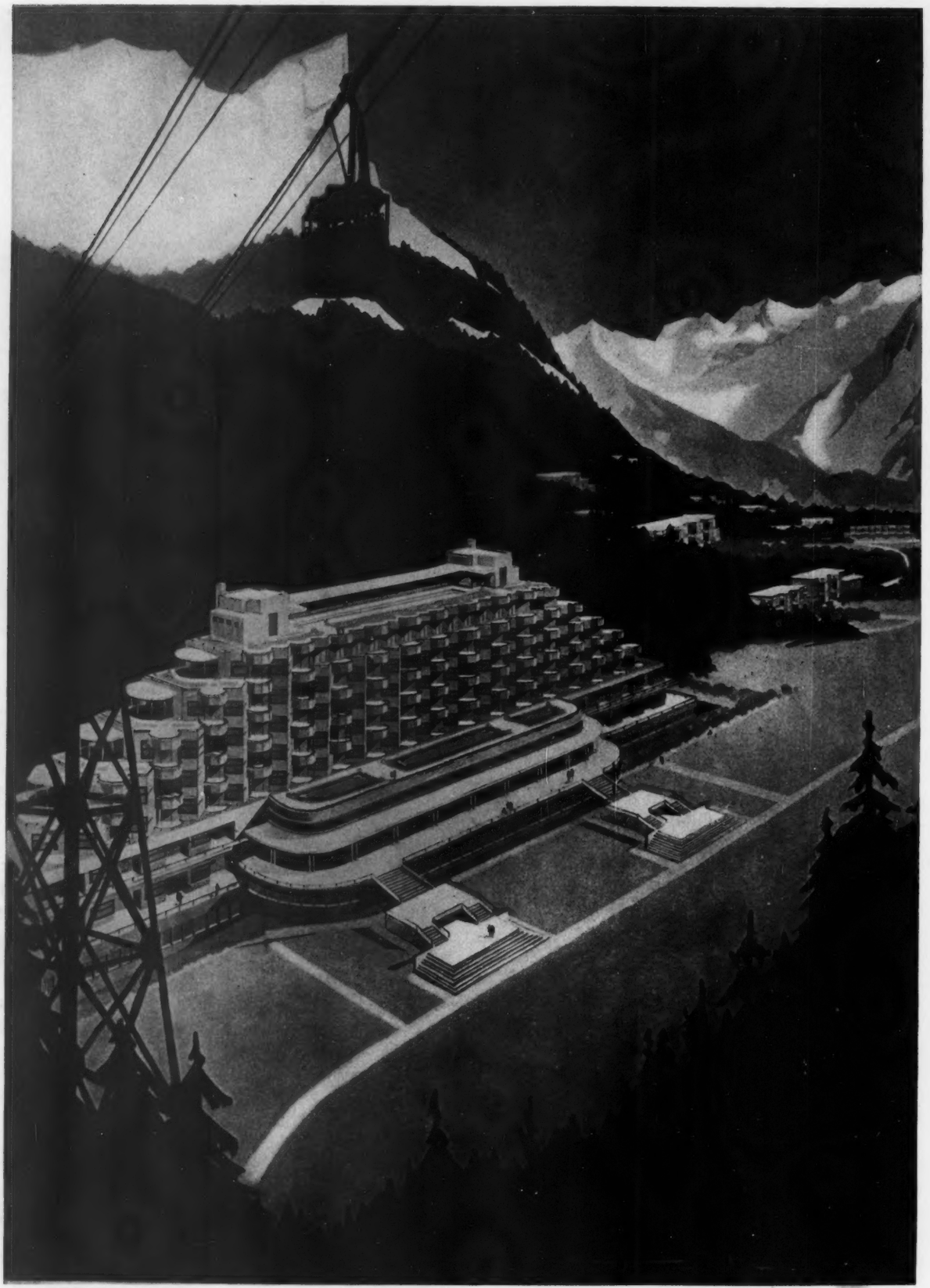
The railway terminal station, however, is a problem of today, a "real gateway of a modern city," with adequate, well arranged space for the great number of patrons of two kinds, commuters and strangers, to ask for information, buy tickets, check parcels, telephone, and enter or leave train platforms. The Grand Central Station and the Pennsylvania Station in New York are "modern" architecture: such buildings will be referred to in the future as the architecture of today.*

**Harvey Wiley Corbett on Modern Architecture in the "Encyclopedia Britannica," 13th Edition.*

But the most dramatic example of modern building is the office building of many floors, a result of steel construction, of the perfecting of the elevator, of rapid transit. On the too-narrow streets of modern cities, the first requisite is good light and air. Here again the "typical floor" is first studied, to so arrange the offices that the maximum income from rent may be obtained. At first owners of land built without thought of neighbor or public. Today, with zoning laws, buildings are designed partly with an eye to the general good. It is likely that in future there will be greater restrictions to this end.

These zoning laws, to protect the light of neighbors, limited the height of the wall at the building line and required set-backs above that, with the privilege in New York (the pioneer in dealing intelligently with the skyscraper) of building to any height on 25% of the lot. This has resulted in entirely new forms in architecture; these, too, are "modern," whether with or without cornices, with decoration or avoiding it. The set-back building of today is a finished product, often extremely well studied, but is likely to be surpassed by the building of tomorrow, as restrictions are revised, and the building of larger and larger parcels of ground is conceived and planned at one time. Most of this commercial building, even though of steel faced in granite, has a comparatively

The thinness of the reinforced concrete construction is shown by the section at the right. So many things that formerly could not have been built are now possible, as a result of the use of reinforced concrete, that many new forms will be added to the vocabulary of the architect.



From "L'Architecture"

POSTER PERSPECTIVE OF SANATORIUM AT PLAINE-JOUX-MONT-BLANC—
P. ABRAHAM AND H. LE MÊME, ARCHITECTS

A solution of one of the new programs that have developed in very recent times. The denticulation of the façade makes it possible for a great many rooms to have two sides toward the south (see plan opposite), so as to be sunny all day long.

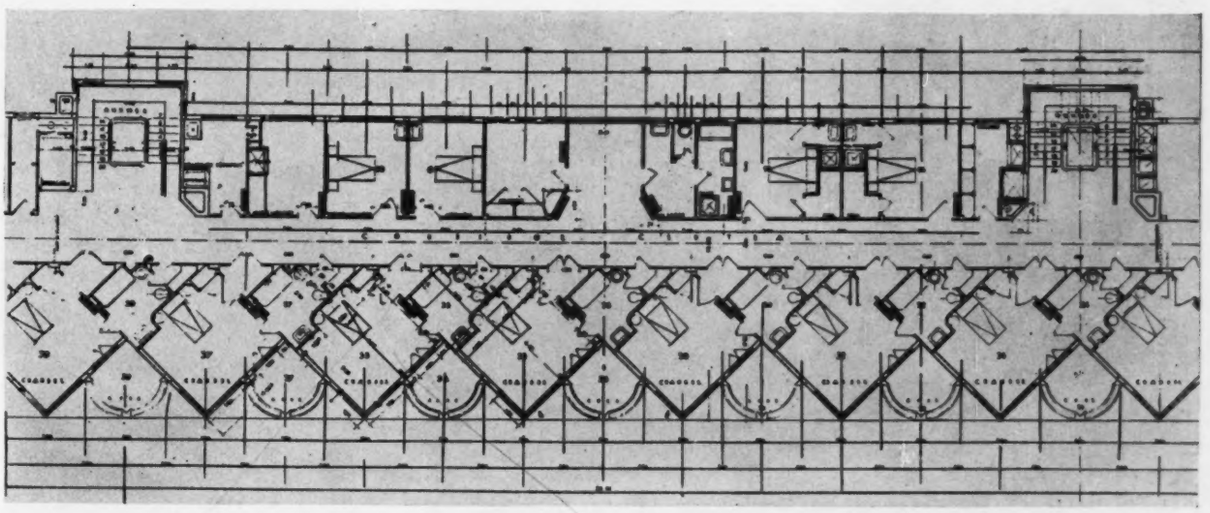
short life, because of the constant improvement in elevator and other mechanical services, just as an automobile—even the expensive one, carefully made, of the best materials,—lasts but a few years.

The modern plan, then, is different in two ways: in program, and in construction. The thin *poché* of a program as simple as Tournon's church can be visible. For a more complex program, with a number of rooms—especially rooms over others—the construction, though thin, can not be visibly thin, because of the great number of mechanical lines going by one room to reach those beyond, ventilating ducts, heat risers and returns, hot and cold water pipes, soil pipes, ice-water lines—an amazing number—and, sometimes especially, air intakes and exhausts of great size.

We no longer permit these lines to be visible; not only because they are and must be unsightly (for they must be designed for efficiency solely), but also because they would be an added care if exposed, more surfaces to be kept clean, to be dusted, painted, and so on, which would require collectively a great amount of labor. Being thus covered—"furred-in" —the construction, though thin, takes on in many cases the reveals of stone construction.

The endeavor is not at all to start with stone construction forms, and run the mechanical lines through the spaces so formed, but to place the service lines so that they interfere least with the proportions of the building, and "fur-in" for them as necessary. There usually results a furring of greater dimension than the designer would use to satisfy his ideas of proportion.

There are thus great differences between the plan of single buildings of today and of a few years ago. The architecture is the expression of a different social outlook—a democratic, a socialistic, point of view. And we see more and more clearly that this idea of regulating building, as well as other things, for the greatest good of the community, is adding a (comparatively) new program—that of the city plan. Here the characteristic is a simplification over present conditions, although a town plan is made up of a number of the very complicated units we have just been discussing. Most of this city planning is still on paper; it is nevertheless the most "modern" of the expressions of modern architecture, as we shall see in March PENCIL POINTS.



PLAN OF CENTRAL PORTION, TYPICAL FLOOR OF SANATORIUM OF PLAINE-JOUX-MONT-BLANC—
P. ABRAHAM AND H. LE MÊME, ARCHITECTS

The rooms for consumptives are so arranged as to have two sides facing south, with thorough ventilation. Service and minor rooms are to the north of corridor.

PENCIL STUDIES BY FRANK H. SCHWARZ FOR PAINTINGS SHOWN ON PAGE 117

THESE DRAWINGS WERE MADE ON TRACING VELLUM—THE HIGHLIGHTS WERE BRUSHED IN WITH CHINESE WHITE

ADVENTURES OF AN ARCHITECT

IV—THE EARTH AM SQUARE AND THE SUN DO MOVE!

By Rossel E. Mitchell

"PUT DAT LIGHT OUT!"

The pastor of the First A. M. E. Zion Church looked up from the chancel to the gallery. A sea of sable countenances stared back. He bent to speak again to the notorious negro gambler and ruffian who was kneeling at the rail.

"Put dat light out!"

Again a stentorian voice bawled forth from the gallery. A second time the minister, himself a full-blooded negro, of powerful build and vocal equipment, glanced upwards. The sea of dusky faces in the lower firmament turned curiously toward the lesser sea on high. The preacher paused, and again bent over the penitent.

"Put dat light out!"

The insistent booming from the gallery could no longer be ignored.

"What do you mean, brudder, by callin' out dat-a-way to put out de light?"

"Don't de Good Book say," came back from the heights, "As long as de light hold out to burn, the vilest sinner may return?"

A gale of laughter swept the tense assembly. It was as a cool breeze suddenly dispelling the fervent heat of midsummer. Perhaps it was even as a whiff from the fronded palms of the heavenly isles to a wayfarer standing on the sulphurous brink of the Bottomless Pit, for hell is never far away from the pulpit of a negro evangelist.

But levity and hell fire no more mix than flaming fagots with the contents of a fire extinguisher. A negro preacher's ready wit has saved many a situation from disaster, imminent through the keen sense of humor of his hearers. Without a moment's hesitation the pastor came back:

"Yeh, brother, but de Book also say, 'Excep' yo repent, yo shall all likewise perish'!"

"A-a-a-a-a-a-a-a-a-MEN!" sprang from a thousand throats.

The interlocutor was silenced, the congregation brought back to the smell of brimstone, the sinner was "brought through" and the evening made a great success.

This story was told me by a negro pastor, one of those numberless men of that interesting race, who pass their days in an endless struggle to inculcate morals where none exist, and teach religion suited to the elemental needs of their people. These men as a class are the salt of the earth in their own sphere. They seek neither publicity nor "social equality." Humble, hard working and intensely devout, they have done more to maintain good relationships between the races in the South than all the legislation, social agencies, and uplift work of all the whites put together.

The modernist and the scoffer may scorn their religion, ridicule their faith in the Book, and belittle their influence. The fact remains that they know their own people, teach them incessantly the homely virtues of the Christian faith, inculcate respect for their white employers and counteract the propaganda of disturbers, even of their own color.

The most famous of these men perhaps, throughout the entire South, was John Jasper of Richmond, Virginia. To this day any older or middle-aged resident of the Southern metropolis smiles broadly at the mention of his name.

John Jasper had the negro's gift for fervent oratory. He was a man of one book, that book the Bible. Critics might laugh at his exegesis, but none doubted either his sincerity or his influence for good among his people. Jasper became in time an institution in Richmond. Hotels advertised his church services as one of the unique attractions of the city. Rarely a Sunday night but found a substantial number of whites occupying the gallery of his crowded church, while Jasper fervently portrayed the torments of the damned and the glories of the saved.

But the climacteric of Jasper's forensic efforts came in the sermon that gave him a reputation far and wide, leaping the bounds of both his city and state.

The subject of this sermon echoed in another sphere the resounding theological tilts of the late Nineteenth Century. It epitomized the battles between science and religion. And if, as some cynics would say, Jasper knew nothing of either, it is certain he was no more ignorant of science than some theologians of his day, and probably had more real religion than certain pseudo-scientists who find the pen mightier than the test tube. So when it became known that Rev. John Jasper was to preach the following Sunday on his famous text, white people crowded the compliant colored congregation out of the gallery altogether.

As the hymns and prayers were sung and said, the Scriptures read and the offering taken, the atmosphere became tense with interest. Opening the great volume before him, the famous old negro announced.

"De subject of my sermon today is taken from de Holy Scriptures and is as follows:

"DE 'ARTH AM SQUARE AND DE SUN DO MOVE."

Followed a Biblical proof, illustrated and driven home by numberless texts, purporting to show that "de 'arth am square" because otherwise why would the Bible speak of the "four corners" of it and the ends of it?

"The ends of the earth shall be glad!"

And how could the sun be set still in the heavens

with the four-cornered earth whirling about it, when Joshua told the sun to stand still, and it stood still upon Askelon?

Let us not point the finger of scorn in Jasper's direction. The memory of the persecution of Copernicus is too green, and the learned theologians of a great university of Portugal solemnly declared Columbus to be in error as to his theory about the roundness of the earth. They pointed to the Psalm, "He spreadeth the heavens as a tent!"

It was my lot to be called on several times to build negro churches. Although living in another city I was also asked into consultation about some proposed alterations to the church where John Jasper long held forth.

It was a large brick affair, clean and well kept up. As I went about taking measurements, a quiet young colored man came up and respectfully asked if he could be of help. I thanked him and gave him one end of a steel tape. After a time I asked if he was a member of this church.

"Yessuh," said he, "I'm a figgerhead in this church, sah!" As a matter of fact, this was no new ecclesiastical office to me; having attended church all my life I had observed numbers of such. Here, however, was the first instance I had ever known of the title being acknowledged.

Suppressing a rising tide of hilarity I inquired, "A figurehead? Just what do you have to do?"

"Well, sah, it's like this. You see the pastor has the boa'd of older men that handles the affairs of the church. Then he has another boa'd of young men. So when anything comes up he gives it to us younger fellows to figger on, and we's the figger heads for the whole church!"

Some people think F. W. Woolworth made the greatest discovery of the Nineteenth Century—the value of a nickel. The negro preachers of the South antedated his find by several decades. While white people frequently look to a few wealthy persons to carry the principal load in a church-building enterprise, the negro preachers have had no such source of income. Long ago they learned the Scotch adage, "Many a mickle makes a muckle."

My first negro church building was a revelation to me in church financing, also in patient sacrifice and devotion to a cause.

The church in question was for a Baptist congregation having 2,500 members. Not a rich man, not even a well-to-do person in the lot. The ground had been paid for after several years of effort, and a few thousand dollars put aside in the bank. A first mortgage was finally negotiated from some white "friends" for about one-half the projected cost of $75,000.00. For this kindness their white friends charged ten per cent of the face of the loan, plus six per cent interest per annum. With a large part of the money still unraised they set about building. In two years (for the time was deliberately slowed up) the church was complete, and a grand dedicatory service was held. Leading white ministers spoke. With the help of their bank they squared up with the builder. My own payments had been made with reasonable promptness. In less than seven years the entire indebtedness was wiped out and ground purchased for an addition.

The financial plan was interesting. Nearly every man, woman, and child in the church contributed weekly from five cents up. No one gave more than a dollar per week. The money came in regularly and the total was a substantial sum. During the same period the large, wealthy church of which I was a member, carried a debt uncurtailed, sometimes borrowing from the bank to pay interest.

It is not surprising therefore to one who knows their methods and persistence to be informed that ten per cent of the entire wealth of the negroes of the South is invested in church property—literally the Biblical tithe.

GREEK LANDSCAPE—PENCIL SKETCH BY MISS E. REINHOLD

THE GEOMETRY OF ARCHITECTURAL DRAFTING

7—SOME DETECTIVE WORK

By Ernest Irving Freese

EDITOR'S NOTE:—*This article, which is copyrighted, 1930, by the author, continues the series begun last August.*

THE GEOMETRY of space is an abstract science. The geometry of drafting is an applied art.

In space, a point is that which has no material extent. The only thing which has no material extent is an idea. Theoretically, then, a point is an idea. A line is a long idea. A long idea moved sidewise, or revolved, generates an ideal surface; and such surfaces, enclosing nothing, form the idea of a solid. These ideas are symbolized by algebraic equations.

On the drafting board, points and lines are *material* things: marks, made with sharpened instruments. In the *art* of geometry, then, points and lines not only possess magnitude, but magnitude in two directions—in fact they possess magnitude in *three* directions. Just try to erase some of the "ornery" ones and you'll speedily discover the third dimension—perpendicular to the plane of the paper! Intersecting lines create an area at their crossing—an area common to both and contained within them. This *area* is their *point* of intersection. Some of these interesting points are shown in Figure 59—through a magnifying glass. If the intersecting lines be inclined to one another, then the "points" of intersection—the filled-in *areas* of Figure 59—will be longer than they are wide. And the length increases much faster than the acuteness of the angle between the crossed lines. Moreover, in the *art* of geometry—which is *practical drafting*—a tangent to a curve, instead of just "touching" it, *intersects* it to the extent of the thickness of the line used to represent said tangent. And, as Figure 59 shows, the "point" of tangency possesses a length that virtually makes it another line—a line often so long that its geometric identity as a point is utterly lost and must be detected by yet another line crossing the center of the intersection area in a direction perpendicular to that of the tangent—that is, normal to the curve. In other words, in all cases where points are to be located by one line crossing another, the angle of crossing should—by another geometric operation if necessary—be made great enough to cause such resultant points to approach in length the thickness of the line used. And the nearer such points come to the square of the thickness of this line, then just that much nearer will the *art* of geometry materialize the mathematical conceptions of the unhampered science that underlies it and is, in *fact*, the foundation of all drafting.

Space is infinite. The drafting board, in comparison, is minutely finite.

If two lines of space come together at some point, say, in the Milky Way, then it is a simple matter to idealize a third line that would intersect the other two at that precise point in the Milky Way. In other words, in the *science* of geometry, no point is inaccessible. But, in the application of this science to the finite problems of drafting, such required points are often "off the board" or, to use a phrase coined in the drafting room, "over in the next county." Yet, somehow or other, a third line must be directed to that out-of-town point regardless! Well, the same science that gets us into this predicament shall get us out of it!

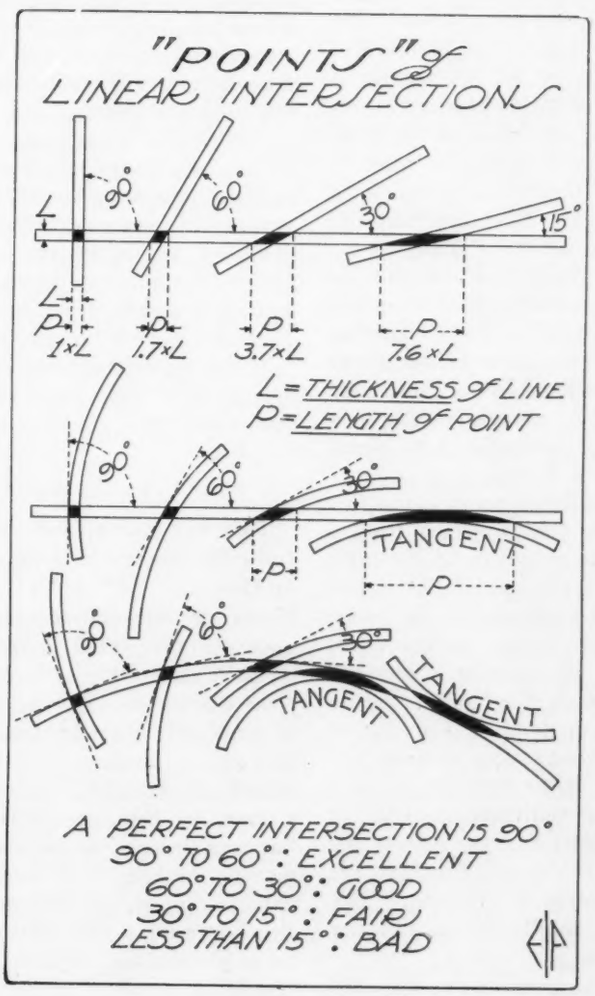


FIGURE 59

Points located by direct measurement are subject only to the possible error of measuring. But points located by one line crossing another — as practically all points in geometric constructions *are* located — are subject to the widely-variable error of obscured intersections *plus* the possible error of accumulation. Figures 59 and 60 graphically substantiate the latter facts. In both these

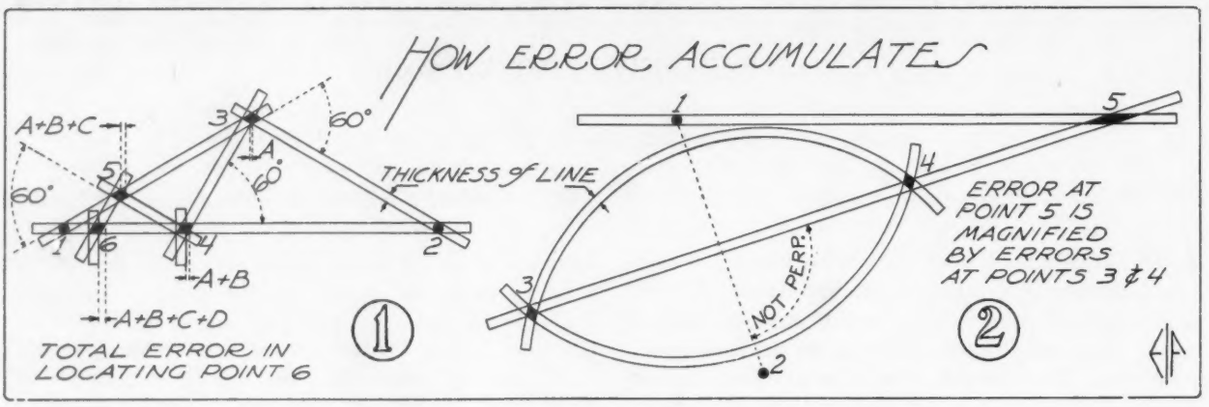


FIGURE 60

Figures the thickness of the line is used as the gauge of the possible error. For example, in Figure 59, a "point" located by one line crossing another at an angle of 15 degrees, would have a "length" nearly eight times the thickness of the line: that is to say, at least seven other lines could, without touching each other, be drawn *in another direction* through a point so located and yet remain within the shaded *area* of the intersection. However, Figure 61 — the "Cross Patch"—serves to indicate that another condition operates to make this condition not quite so bad as the emphatic representation of it appears in Figure 59; namely, that the *cross* formed by the intersection of two acutely converging lines is always *thinnest* where the *point* is *thickest*—that is, at the center of the crossing. Possibly, then, *in a crossing of not less than 15 degrees*, close scrutiny and indenting will "detect" the required "point." Possibly not. Most assuredly not in case the intersection angle is still more acute, as, for examples, the commonly occurring "bad" ones of the Cross Patch. In any case, however, regardless of the angle of crossing, a point so located should, if another line is to be projected therefrom, or a measurement made thereto or therefrom, be fixed by the same close scrutinizing and indenting. The ensuing line can then be drawn by first placing the conical-point of the pencil in the indent—thus avoiding a further possible error of drawing a line *from* an indefinite point. Any line can, in this manner, be accurately projected *from* a point occurring on another line *regardless of the angle of projection.* Remember: the angle at which one line *leaves* another from an already fixed point on the latter, is *not* an angle of *intersection:* hence, in these cases, the operation is merely that of drawing a required line from or through a *definitely fixed point.* So no "detective work" is here required other than that of fixing the given point in the most precise manner possible, that is, by indenting it slightly with the point of the dividers. For this purpose—indentation—you can dismantle your "spring" dividers and use one of the legs. It's more "handy"—and the spring dividers are of no other use as an instrument of precision. The bow spacers and compass fulfill all such latter demands.

In Figure 60, the diagrams suggest but two instances of the errors of accumulation. There are many others. The construction shown at Diagram "1," if accurately performed, will result in the distance *1-6* being exactly one ninth of the distance *1-2*. Try it. But first fix the points *1* and *2* by indenting, or you may possibly commit an *initial* error in getting away to point *3*. In the case here shown, all angles of intersection are 60 degrees. Hence, since this classifies as "good," the probability of error is here very slight: the maximum accumulation at point *6* could only be about one half the thickness of the line used, *provided* the lines "hit" somewhere within the *area* of the shaded intersection points, and provided further that your 30-60 triangle is correct. At Diagram "2," in the same Figure, the perpendicular bisector, *3-5*, "hits" the points *3* and *4* all right—but at opposite extremes of these points. Hence, the "perpendicular bisector" is not perpendicular and is not a bisector! This condition of things not only throws point *5* farther from point *1* than it should be, but, by thereby lessening the angle of intersection, it renders an appreciable accumulated error in locating point *5* very probable—unavoidable, in fact. If point *5* were the required center of a circle, of radius *5-1*, that must come tangent either to another circle or to a given straight line—well, there'd be a "holiday" somewhere that you "couldn't account for." Now you *know*.

I: In the Cross Patch

Now cast your apprehensive optics down the devious and interesting paths of the "Cross Patch" mapped out in Diagrams "1" to "11," inclusive, of Figure 61. Hesitate at each sign-posted crossing, and there cogitate upon the designated probability of a well-sharpened six-aitch pencil "hitting"—without a detour—the next point enroute through this mystic but profitable maze of geometric fructification. Then—whether you've located the dictionary, or not— reach for your T-square and triangles. Go to work on the Cross Patch. Locate, as best you can without recourse to the "detective work" hereinafter shown, the linear intersections marked "bad" and "fair." The ones designated as "good," "excellent," and "perfect" are sufficiently precise in themselves, yet, in case extreme precision is called for, even the good ones can be made to classify as excellent or perfect—as will hereafter be shown. Then, after having traversed the Cross Patch

—no, not alone: I'll accompany you shortly—check the results with what thereafter will follow. You will then learn not only the value of your own optical detective ability, but also the relative value of the precise geometric detective methods in this Part presented.

However—as a preliminary preparation for the above-suggested personally-conducted tour of the Cross Patch—you should first master the straight manipulative method of perpendicular-bisector projection made easy in Figure 62. It has been used and indicated in all of the Cross-Patch problems where such a line is required. This original, precise and speedy manipulation with the T-square and 45-degree triangle obviates the use of the compass in locating point *e* equidistant from the two given points *a* and *b*, or, which is the same thing, equidistant from the ends of the given line or chord *ab*—real or imaginary. After this one point, *e*, is fixed as shown at Diagram "A," then slide the 45-degree triangle along the obliquely-held T-square to the required position, *4*; remove the T-square if it's in the way (as has been done at Diagram "B"), hold the 45-degree triangle firm, and project the required perpendicular through *e* to the required point *f* with another triangle operating at right angles to the first—the net result being as shown at "C." It's easy—and fast, once you get the "idea" —and, moreover, *this* perpendicular bisector is bound to be *perpendicular*, and it does not, therefore, carry forward any "accumulation of error." (Figure 60 shows how *not* to do it.) The point *e*, of Figure 62, is identical with point *1* of Diagrams "1," "2," "3," "7," and "11" of the Cross Patch, and with point *4*, Diagram "4," same Patch. Since it forms a 90-degree cross, it classifies as "perfect." This point, however, as well as the given points, should first be indented before projecting the ensuing points or lines therefrom. Now for that personally-conducted trip through the Cross Patch:

PROBLEM 1: (Diagram "1" of Figure 61) *To locate the two centers of the segmental Gothic arch;* given one spring point *a*, the crown point *b*, and the vertical jamb lines *af* and *dc*.

Solution: Cross *dc* with the perpendicular bisector, *1-2*, of *ab*. Point *2* is one of the required centers. Cross *af* with a horizontal, *2-3*, from *2*. Point *3* is the other required center.

In an arch of this type, with centers on the *jamb* lines, the chord *ab* is *always less* than the span *ae*. When the chord *equals* the span, so do the radii, and the arch thereby becomes "equilateral" with centers at the crossing of the jamb lines and spring line. Hence no construction is then required.

PROBLEM 2: (Diagram "2" of Figure 61) *To locate the two centers of the lancet Gothic arch;* given the spring points *a* and *e*, the crown point *b*, and the projected spring line *cd*.

Solution: Cross *cd* with the perpendicular bisector, *1-2*, of *ab*. Point *2* is one center. Make *a3* equal *e2*. Point *3* is the other center.

In an arch of this type, with centers on the *spring* line, the chord *ab* is *always greater* than the span *ae*. It is thus seen that the "equilateral" Gothic arch is the ultimate coincidence of the "segmental" and "lancet."

PROBLEM 3: (Diagram "3" of Figure 61) *To locate the two centers of the Moorish arch;* given one spring point *a*, the crown point *b*, and the projected vertical jamb line *cd*.

Solution: Cross *cd* at point *2* with the perpendicular bisector, *gh*, of *ab*. From any point on *gh*, say *3*, project a horizontal to cross the vertical jamb at point *4*. From point *3*, as a center, swing the arc *4j*. From *2* project a line through *a* to cross this arc at point *5*. From point *a*, in a direction paralleling the direction *5-3*, project a line to cross *gh* at point *6*, which is one center. The other center, point *7*, is symmetrically disposed about the vertical *ef*, and on a horizontal through *6*. And this horizontal, being perpendicular to *cd*, will cross the latter at the tangent point *8*. The two equal arcs of the arch will cross at the crown point *b* because said point lies on the perpendicular bisector *ef* of their "line of centers" *6-7*.

For the benefit of the "mathematical hounds," it is here mentioned that this construction is based on the fact that point *2* is the *center of similitude* of all circles drawn tangent to *cd* from centers on *gh*. Moreover, if the given or assumed conditions should cause point *6* to fall to the right of *ef*, the arch will lose its point and, instead, become cusped at the crown. If *6* falls exactly on *ef*, the arch becomes one-centered, hence, a "major segmental" or "horseshoe." This is an interesting one to "play with." And it's educational as well. But be careful of that "fair" crossing at point *5*. It's "not so good."

PROBLEM 4: (Diagram "4" of Figure 61) *To locate the four centers of the Tudor arch;* given the crown point *a*, and the jamb line *bc*.

Solution: From *a* project an extraneous line, *a1*, at a slope of 7:12, to cross *bc* at point *1*. This is the spring point. From *a* project a 45-degree inherent oblique, *a2*, to cross a horizontal from *1* at point *2*. This is one haunch center. From *a* project the extraneous line *ae*, at a slope of 1:12 relative to the vertical. Make *a3*, on *ae*, equal the haunch radius *2-1*. Cross *ae*, at point *5*, with the perpendicular bisector of *3-2*. Point *5* is one crown center. But it's a "bad" one! The remaining two required centers, points *9* and *10*, are symmetrically disposed, in respect to centers *5* and *2*, about the vertical center line *8d* of the opening, and on horizontals through these other centers. To detect the obscure tangent point of the haunch and crown arcs at point *6*, project their line of centers, *5-2*, to cross either arc at that point. The crown points *a* and *8* will define the acute crossing of the two equal crown arcs swung from centers *5* and *9* because the line *8d* —the center line of the opening—is the perpendicular bisector of their line of centers *5-9*.

PROBLEM 5: (Diagram "5" of Figure 61) *To determine the direction of the reaction, R', at the fixed*

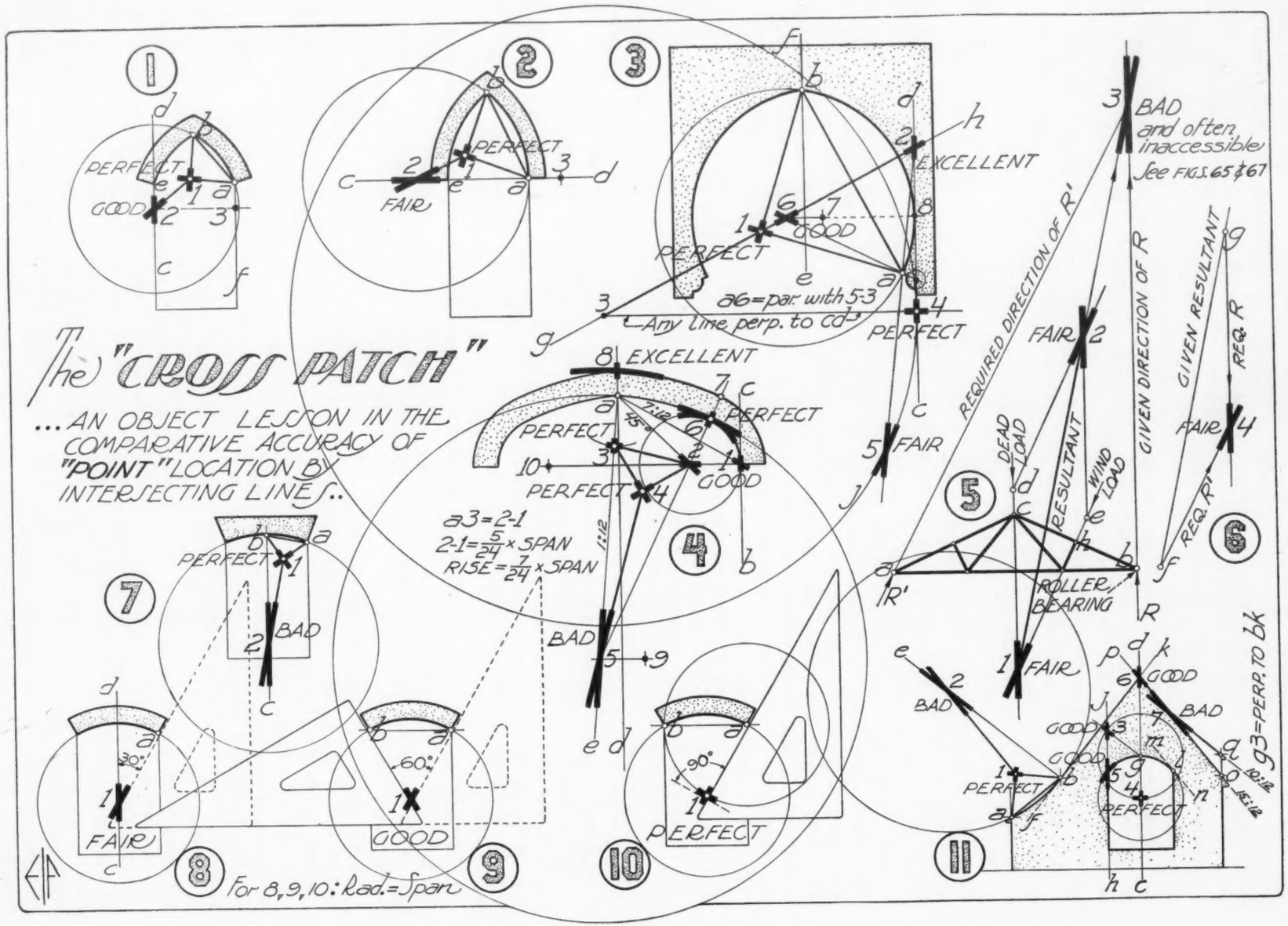

The "CROSS PATCH"
...AN OBJECT LESSON IN THE COMPARATIVE ACCURACY OF "POINT" LOCATION BY INTERSECTING LINES..
PERFECT
GOOD
FAIR
EXCELLENT
BAD
and often inaccessible
See FIGS. 65 & 67
a6=par. with 5-3
Any line perp. to cd
PERFECT
REQUIRED DIRECTION OF R'
GIVEN DIRECTION OF R
GIVEN RESULTANT
REQ. R
DEAD LOAD
WIND LOAD
RESULTANT
ROLLER BEARING
R'
R
REQ. R'
a3=2-1
2-1=5/24 × SPAN
RISE=7/24 × SPAN
7:12
10:12
g3=PERP. TO bk
For 8, 9, 10: Rad.=Span
1
2
3
4
5
6
7
8
9
10
11

FIGURE 61

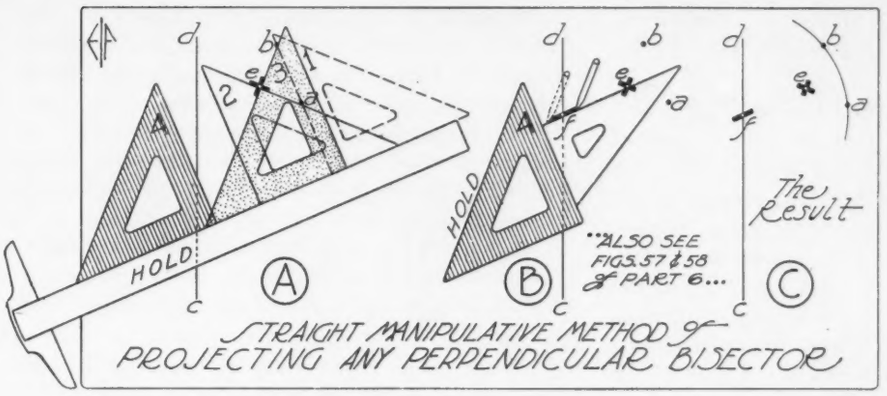

HOLD
HOLD
The Result
"ALSO SEE FIGS. 57 & 58 of PART 6..."
STRAIGHT MANIPULATIVE METHOD of PROJECTING ANY PERPENDICULAR BISECTOR

FIGURE 62

end of the truss; given the lines of action, *dc* and *eh*, of the total dead load and wind load, respectively, and the magnitude of each.

Solution: Project *dc* and *eh* to cross at point *1* —which yields just a "fair" intersection. Lay off *1d*, to any scale, equal to the total dead load. Lay off *1e*, to the same scale, equal to the total wind load. From *d* and *e* project lines parallel with *1e* and *1d*, respectively, to cross at point *2* —which is one way of "fairly" locating point *2*. A better way, provided point *1* is made "good," is to make *d2* equal *1e* directly, which can be accurately done by indenting a strip of tracing cloth or paper placed *over* the points, and then transferring this distance in a similar manner—that is, by indenting *2* through the indent made in the tracing cloth or paper. Well, in any case, the line *1-2* represents not only the magnitude but also the resultant *direction* of the combined dead load and wind load. Hence, since the reaction *R*, at the roller-bearing end of the truss, can be in no direction other than vertical, and since, for equilibrium, the resultant's line of action, *1-2*, must tend to the same point as its resolved components, it follows that the required component direction of *R′* will be established by a line directed to the point where the projected line *1-2* would cross a vertical from *b*—which is point *3*, and another "bad" one. Nevertheless, the line *a3* represents the required *direction* of *R′*.

Although, in the above problem, I have assumed that point *3* is "on the board," this is one of the many cases occurring in graphic statics where this required point is more apt to be "over in the next county." But I'll attend to that presently. Meanwhile:—

PROBLEM 6: (Diagram "6" of Figure 61) *To determine the magnitude of the truss reactions R and R′;* given their respective *directions* (*b3* and *a3* of Diagram "5") and the *magnitude and direction, fg,* of their resultant (which is *1-2* of Diagram "5").

Solution: From *g* project a line paralleling *b3* of Diagram "5." From *f* project a line paralleling *a3* of Diagram "5." They will cross at point *4*, which limits the magnitude of the reactions *R* and *R′* when measured to the same scale as *fg*. The crossing at point *4* here classifies as "fair." But often it's exceedingly "bad"—so much so, in fact, that, unless you know the "trick" of making it "good" or "excellent," you'll waste a lot of valuable time with the "slip stick" trying to *figure* those reactions instead of just *measuring* them! Of which —more later.

PROBLEM 7: (Diagram "7" of Figure 61) *To locate the center of a segmental circular arch;* given one spring point *a*, the crown point *b*, and the projected center line *bc*.

Solution: Cross *bc* with the perpendicular bisector, *1-2*, of *ab*. Point *2* is the required center —if you can find it!

PROBLEM 8: (Diagram "8" of Figure 61) *To locate the center of a 60-degree segmental arch;* given one spring point *a*, and the center line *cd*.

Solution: From *a* project a 60-degree inherent oblique to cross *cd* at the required center *1*. Sure —"every draftsman in the country knows how to do it." In fact it represents the sum total of the geometric "knowledge" of some draftsmen! And it's not even "good"—just "fair." Read on. It can be done just as quick, *better*.

PROBLEM 9: (Diagrams "9" and "10" of Figure 61) *To locate the center of a 60-degree segmental arch;* given the spring points *a* and *b*, but NOT THE CENTER LINE.

Solution 1: (Diagram "9") Cross 60-degree converging lines from *a* and *b*. "Good."

Solution 2: (Diagram "10") Cross a 60-degree oblique from *a*, with an arc from center *a*, radius *ab*. "Perfect." And the compass is all set for the arch. Now take your choice. But possibly you want to draw only *half* an arch—in which case, the center line *is* given, and only *one* spring point. See Figure 66, Diagram "3" if you can't wait 'til we get there. Or you can set the compass to the known radius of the arch and cut the center line with it from the one spring point as a center. This'll classify as "good" also.

PROBLEM 10: (Diagram "11" of Figure 61) *To locate the center for the roof sweep;* given the points *a* and *b*, and the extraneous raking line *bk*.

Solution: From *b*, project *be* perpendicular to *bk*. Cross *be* with the perpendicular bisector, *1-2*, of *ab*. Point *2* is the required center.

The sweep will come tangent to the main roof slope at *b*—which is quite the proper thing for it to do. That's why it's sometimes called an *easement*. Not abrupt. But you may have to do some "detective work" on that bad crossing at *2*, if you want to get the radius *exact*—although, in this case, as in all cases where points are determined by "looks," the point *a* is not necessarily immobile! And it's easy enough to set the compass to *some* radius on the right-angular line

FIGURE 61

be—and let *a* go hang, for an inch or so. (Notation: See Figure 3, Part 1, and Figure 50, Part 5, for *gambrel* roof sweeps.)

PROBLEM 11: (Diagram "11" of Figure 61) Here we take another sally into the field of *design*. A segmental arch in a gable end appears the most pleasing when an imaginary tangent, *mn*, at either spring point, parallels the corresponding rake. Hence: *To locate the center of the arch;* given the center line *cd*, the *crown* point *g*, a jamb line *hj*, and the direction, say *bk*, of the spring-point tangent on that side of the center line. (Note that the crown point is given, *not* the spring points—for the height of the arch is limited by the ceiling line of the room.)

Solution: Easy! From *g* project a line perpendicular to *bk* and crossing *hj* at point *3*. Then *g3* is the radius of the arch. Hence, from *g* as a center, revolve point *3* to the center line at point *4* and draw the arch.

Now, assuming the points *o* and *q*, as fixed, see how precisely you can locate the intersection point, *7*, of that dormer roof and main roof. Not *very*—if you had to tell a carpenter just *where* to place that "header" instead of leaving it for him to *guess at*.

Well—our chanceful little game of "Cross Patch *draw* the latch" has "come eleven"—which is lucky, for the double-six calls for the detectives!

II: Anywhere on the Board

PROBLEM 12: (Figure 63) *To double the angle, A, between the line a-c and the imaginary perpendicular bisector of the chord a-b.*

Solution 1: (Diagram "A") From *a* and *b* as centers, with a radius about three fourths of *ab*, cross arcs at *1*, and cross *ac* at *e*. Make *1f* equal *1e*. Then *bf* makes twice the angle with *ac* as *g1* does. Observe that this construction does not require that the perpendicular bisector *g1* be drawn—nor should it be, since the object of this construction is to *detect*, rather than obscure, the point *2* where said bisector would cross *ac*. The dotted lines in the Diagram merely indicate the unrequired portion of the usual Euclidean construction for perpendicularly bisecting a straight line, which latter is here the chord *ab*.

Solution 2: (Diagram "B") From *a* as a center, any radius, cross the two given lines at *e* and *h*. From *b* as a center, same radius, draw the arc *jfk*, and make *jf* and *fk* equal *eh*. Then a line perpendicular to *jk*, projected through *f*, will cross *ac* at point *2*, which is the same point at which the perpendicular bisector of *ab* would cross at *half* of the angle *f2a*. The instrumental manipulation for projecting *f2* is indicated in this Diagram by the dotted lines.

Now—take note—by either of the above simple operations, the "fair" intersection at point *2*, in Diagram "2" of the Cross Patch, could be made *good*. This limited *special method* is not, however, to be confused with the *general detective methods* illustrated in Figure 65, which latter will presently come under consideration. Meanwhile consider Figure 64.

PROBLEM 13: (Diagram "1" of Figure 64) *To detect the points, C, where two equal circles, A and B, cross;* the centers of the given circles, points *6* and *7*, being so close together as to render such crossings indefinite.

Solution: Project the perpendicular bisector, *ef*, of the line of centers, *6-7*, to cross either of the circles. The points of crossing will then define the otherwise exceedingly indefinite points *C*.

This detective resource has been utilized in Diagrams "3" and "4" of the Cross Patch where, in each case, it is readily seen that the center line of the opening is the perpendicular bisector of the "line of centers" of the crown arcs. Figure 64 carries the reference letters of Diagram "3," Figure 61.

PROBLEM 14: (Diagram "2" of Figure 64) *To detect the points, C, where a straight line, B, crosses a circle, A;* the line being so far removed from the center of the circle as to render such crossings indefinite.

Solution: Do not intersect the circle with the line. Instead, "jump" the curve so as to leave it clear for the ensuing operation of detecting the point of crossing. Then, from the center of the circle, point *3*, project a "line of centers" perpendicular to *B*, and crossing *B* at point *l*. Make *lk* equal *l3*, and from *k* as a center swing an arc of a radius equal to that of the given circle. This arc

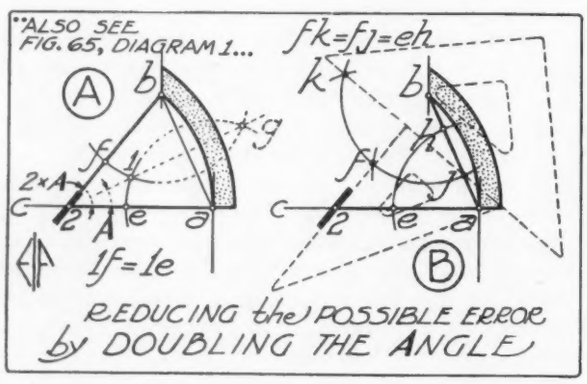


FIGURE 63

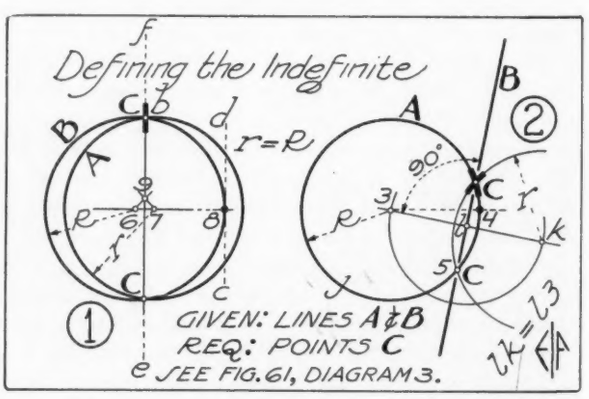


FIGURE 64

will cross the circle at points *C*, which are the *definite* points at which the given line *B* should cross it.

Observe that point 5, in Diagram "3" of the Cross Patch, is an instance where the above recourse would have rendered that intersection "good" instead of being merely "fair."

PROBLEM 15: (Figure 65) *To detect the point where two acutely converging lines would meet or cross;* the required point being "on the board."

General solution: Diagrams "1" to "5," inclusive, cover all possible given conditions. Let *A* and *B*, of any Diagram, represent any two given lines which, if they actually crossed, would be productive of an obscure or indefinite intersection point. All right, then *do not cross them!* Either stop one short of the other or "jump" the intersection as shown. This leaves one of the lines clear—it matters not *which* one—for exact definition of the required "point." Now then, pay attention to every detail: Indent any two points, *L* and *l*, on *one* of the lines, say on *A*. Place the pencil at indent *L* and move a two-instrument sliding combination into touch, bringing the ruling edge of the projecting triangle to cross the *other* line *B* at approximately a right angle—or exactly so if you wish. Theoretically, the angle makes no difference. But, practically, the nearer it approaches a right angle, the more precisely will the next point *M* be located and, hence, the accuracy of the method appreciated. Now *draw* the line *LN*, crossing *B* at *M*. Then, manipulating the sliding combination, produce the other *paralleling* line *ln*, crossing *B* at *m*, in the same precise manner. Next place the bow-spacers precisely at the well-defined point *M*—no, *not* at the indented point *L*—first making their spread *almost* the distance *ML*. Then, by use of the thumb-screw, and meanwhile swaying them slightly back and forth in light touch with the paper, make the free point register exactly with, and *in*, the *indent* previously made at *L*. Now step off this distance *ML* any number of times to *N*, depending on the degree of definition desired or required at point *C*. Identify the divider-indented point *N* with a penciled ring. In exactly the same manner, step off *ml*, on the *other* line, the same number of times, to *n*. Then project *Nn* to cross the one clear given line at point *C*, which is the *definite* point at which the *two* given lines should meet. (See Part 6, Figure 53, Diagram "A," and pertinent text, for the precise technique of projecting an extraneous line through two given points.) In the above construction, the spaced-off distances *MN* and *mn* can also be accurately obtained by indenting and multiplication of the unit distances on a separate strip of tracing cloth or paper, as has hereinbefore been intimated. In fact, there is no more accurate method of transferring given distances. In no case should the dividers be used. If the given distance exceeds the spread of the bow-spacers—use a transfer strip—or the compass. If the latter method is adopted, see to it that the legs are first adjusted *perpendicular to the paper.*

Note that all Diagrams of Figure 65, except Dia-

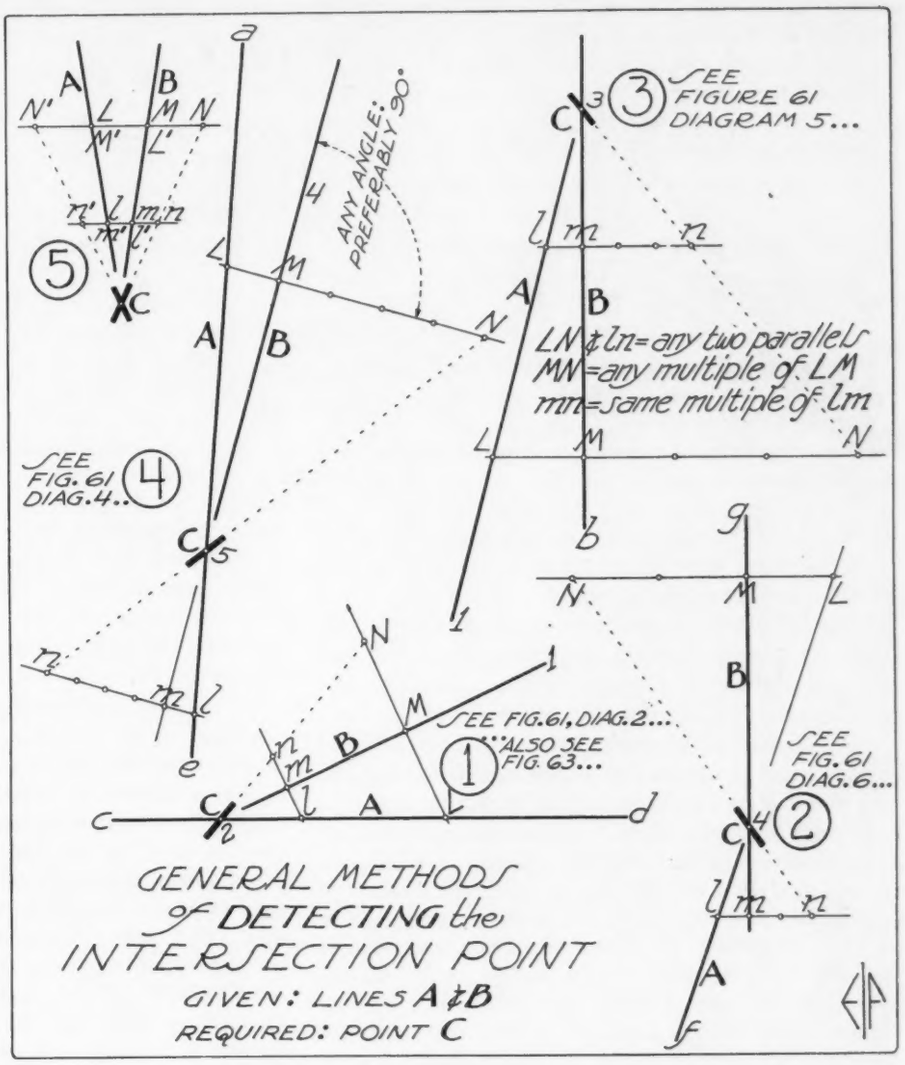

ANY ANGLE: PREFERABLY 90°
SEE FIGURE 61 DIAGRAM 5...
LN ∦ ln = any two parallels
MN = any multiple of LM
mn = same multiple of lm
SEE FIG. 61 DIAG. 4...
SEE FIG. 61, DIAG. 2...
...ALSO SEE FIG. 63...
SEE FIG. 61 DIAG. 6...
GENERAL METHODS of DETECTING the INTERSECTION POINT
GIVEN: LINES A ∦ B
REQUIRED: POINT C

FIGURE 65

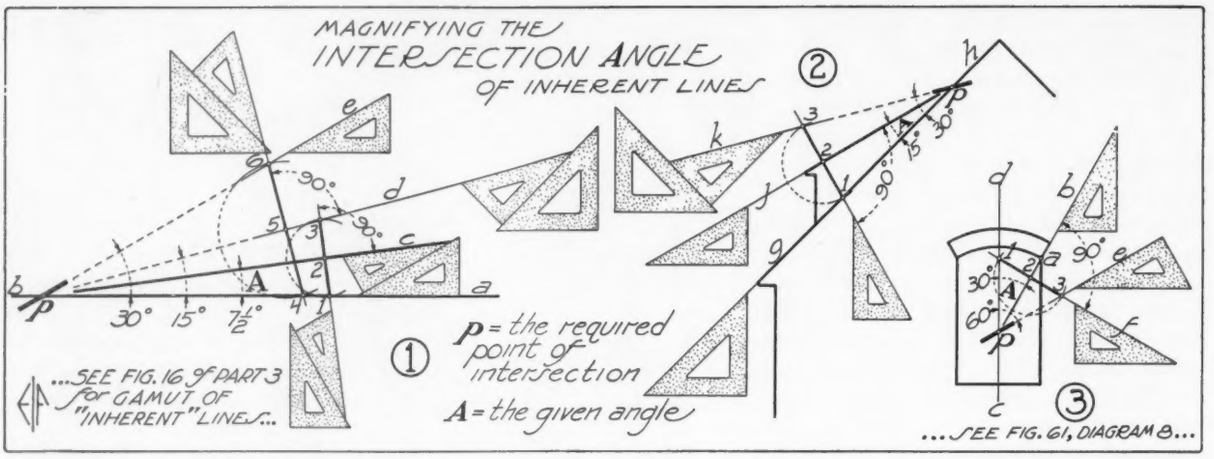

MAGNIFYING THE INTERSECTION ANGLE OF INHERENT LINES
p = the required point of intersection
A = the given angle
...SEE FIG. 16 of PART 3 for GAMUT OF "INHERENT" LINES...
...SEE FIG. 61, DIAGRAM 8...

FIGURE 66

gram "5," bear references to, and carry the reference letters of, those diagrams of the Cross Patch to which they particularly apply. Diagram "1" is further indicative of another method of doubling an angle—a *general* method, in distinction to the special method shown at Figure 63. The general method of Diagram "1," Figure 65, requires that, in order to *exactly* double the angle *1-2-d*, the lines *LN* and *ln* must cross the *given* line *1-2* at *exactly* 90 degrees, and that *LN* and *ln* must be just double the distances *LM* and *lm*, respectively. It is thus made evident that the crossing lines become chords of which the given line *1-2* is the known perpendicular bisector—hence, just reversing the problem of bisecting a given chord. Diagram "2" shows that two lines *obtusely* inclined, form an acute angle beyond their intersection. Hence, the general method here applies as shown, and it is especially—and welcomely!—applicable to many problems occurring in the graphic determination of stresses in structural members. In Diagrams "2" and "4," note that point *C* is an intermediate point on the defining projector *Nn*, whereas, in the other diagrams, this point is on the prolongation of the projecting line. The former method is, therefore, productive of the greater precision in locating *C*, since any error of projection would thereby be *mitigated* rather than *magnified*. A reference to Figure 60, Diagram "2" will render this contention obvious. Diagram "5," of Figure 65, shows how the required point *C* can also be detected by two independent projectors *Nn* and *N'n'*—the Diagram there shown rendering the method clear without other explanation.

You are now fully prepared to make good all those "bad" crossings of the Cross Patch. Well—do it! And see how close they check with the usual "eyeball" methods of detection. Then test the "fair" ones the same way.

Figure 66 indicates the application of the above principles to the detection of the intersection point of acutely inclined *inherent* lines. In this case it is merely necessary to establish *one* chord of *twice* the angle (or of four times the angle) and then, through the *one* point at the free end of this chord, to project another *inherent* line of *twice* the angle (or of four times the angle) to the required point of crossing. Diagram "1" clarifies the simple process, and the other two diagrams suggest practical applications of it—the third Diagram showing how the "fair" intersection so designated at Diagram "8" of the Cross Patch could easily be made "good" if necessary.

III: Over in the Next County

Take another look at the Cross Patch. Up there in the far northeast corner is a "bad" crossing that is also sign-posted "often inaccessible." This means that the two given lines, *b3* and *1-3*, directed thereto, may be so slightly inclined, one to the other, as to throw this point off the board—maybe "over in the next county." Oh well—point *3* is a bad one anyhow, so let's forget it entirely and determine the direction of the required line *a3*—which direction *must* be "as is"—by another simple application of the properties of similar triangles. The method is of general application. So, calling the two given lines *A* and *B*—any two converging lines whatsoever—and calling the required line *D*, cogitate upon the marvels of the abstract science which yields such a practical and easy solution of this oft-occurring problem—which same is:—

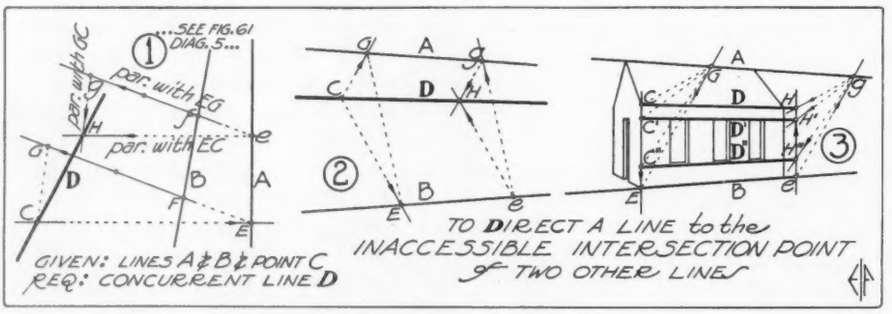

...SEE FIG. 61 DIAG. 5...
par. with EC
par. with EC
par. with GC
GIVEN: LINES A & B & POINT C
REQ: CONCURRENT LINE D
TO DIRECT A LINE to the INACCESSIBLE INTERSECTION POINT of TWO OTHER LINES

FIGURE 67

PROBLEM 16: (Figure 67) *To direct a required line, D, through a given point, C, to the inaccessible or unavailable intersection point of two given lines, A and B.*

Solution 1: In this case the given point does not occur between the given lines. Cross *A* at approximately a right angle—or exactly so if convenient—with a line projected from *C*. Indent the resultant point *E*. Project a line *EG* at any angle that will yield a definite intersection at *F* where it crosses *B*. Multiply the distance *FE* a sufficient number of times to point *G* that will make the imaginary line *GC* lie approximately perpendicular to *EC*. Now indent any *other* point *e*, on *A*. From this point as a starter, construct a triangle *egH* with sides paralleling those of the triangle *EGC*, multiplying *fe*, to make *fg*, the same number of times that *FE* was multiplied to make *FG*. Then *H* is a point collinear with *C* and the inaccessible meeting point of *A* and *B*. In other words, *CH* is the required line *D*. And the direction of this line would be the required direction of the reaction, *R'*, of the truss shown at Diagram "5" of the Cross Patch, provided the given conditions were the same.

Solution 2: (Diagram "2" of Figure 67) In this case the given point, *C*, occurs between the given lines *A* and *B*, but the alternate construction there shown makes the process self-explanatory. Just bear in mind the one prime essential to accurate results: project the similar-triangle lines at such an angle as to render every resultant crossing *definite*. This can always be managed. Note that in *Solution 2* no "stepping off" or multiplication of distances is required. The triangles are formed directly from the conditions given.

The remaining Diagram of Figure 67 suggests a useful application of the above principle to the establishment of any number of *perspectively parallel* lines, when any two such lines are given, and when the so-called "vanishing" point is out-of-town. In the case shown, which is more or less typical, the point HAS vanished—completely—no tellin' where it is! Well—suppose you just want to make a "sketch"—not a perspective accurately projected from the finished working drawings, but just a study or preliminary design. All you have to do, then, is to get any *two* of your perspective lines, that run in the same direction, to "look right," and then place the others by some such method as indicated in the final Diagram of Figure 67. Then they'll *all* "look right." If they don't—there's something wrong with your "design"—not your geometry! The entire process of projecting perspectives *from working drawings* is presented in the author's work entitled "PERSPECTIVE PROJECTION." You can learn it therefrom in a few hours. Now let's go on with *this* geometry:—

PROBLEM 17: (Figure 68) *To bisect the angle between any two converging lines, a and c, when the vertex is "nowhere in sight."*

Solution 1: (Diagram "1") Vertex just off the board. Project any two lines, *be* and *b'e'*, respectively perpendicular to *a* and *c*. Space off, on each, the same two equal distances as shown. Through the resultant points draw lines paralleling the lines from which the respective perpendiculars were projected. The crossing of these two sets of parallels will form a parallelogram of which the diagonal *DE* is the required bisector *B*.

Solution 2: (Diagram "2") Vertex across the room. From any point *b* on either given line, swing the arc *fg*, and cross this at *e* and *d* with projectors from *b* perpendicular to *a* and *c*. With the compass set to any distance, say *dg*, and with the compass legs adjusted *perpendicular* to the paper, mark off the equal distances *dg* and *ef*. Indent *g* and *f*. Cross *a* at *h* with a line from *b* projected perpendicular to *fg*. Then, since *bh* is the chord of an imaginary arc swung from the inaccessible vertex of the angle, the required bisector *B* of this angle is bound to be the *perpendicular bisector* of *bh*—which is easy! Even so, the given lines may be so slightly inclined to one another as to render this method dubious. Then use *number-three-method*, which'll bisect an angle of no degrees at all:—

Solution 3: (Diagram "3") Vertex over in the next county! Indent any two points the same distance apart on *each* leg of the angle. Call these points *b* and *d*, and *e* and *f*, respectively. Now then—the perpendicular bisectors of the diagonals between these two sets of points will cross at *g*. And *g* is one point on the required bisector *B*. But you need another. Well—either repeat the performance at the other extremity of the given lines—or do this: Swing

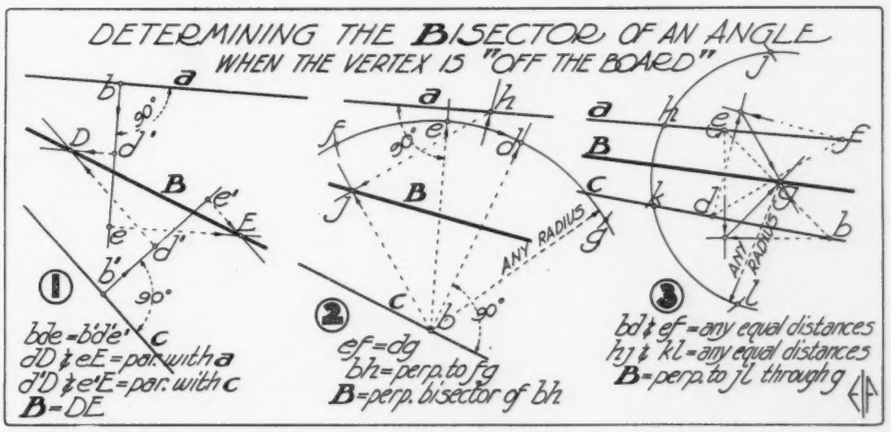

DETERMINING THE BISECTOR OF AN ANGLE
WHEN THE VERTEX IS "OFF THE BOARD"
bde=b'd'e' c
dD ∥ eE = par. with a
d'D ∥ e'E = par. with c
B = DE
ef = dg
bh = perp. to fg
B = perp. bisector of bh
ANY RADIUS
bd ∥ ef = any equal distances
hj ∥ kl = any equal distances
B = perp. to jl through g

FIGURE 68

a large-radius arc from *g* as a center. Mark off with the compass any two equal distances *hj* and *kl*, as shown. Then project the required bisector *B* through *g* and perpendicular to *jl*—which operation can, as you must now well know, be done with exactitude and dispatch with the "sliding triangles."

But I've saved the "simplest" problem of this bunch of inaccessibility for the finish—for the simple reason that its very simplicity seems to render it simply and completely forgettable. Plenty of cases occur in actual drafting-room practice where arcs of large radius must be drawn from centers off the board. Of course, there's a fairly satisfactory way of drawing circular arcs *without* the center point—I'll show that later on—but, in any case, assume that the center has been "lost." The arc has been drawn, all right, but you now need some radial lines that you didn't think about when your paper was down on the floor. Now the paper is back on the board but the center of that arc is—still down on the floor! Listen hard: *The perpendicular bisector of any chord of a circular arc tends unerringly to the center*—it's a *radial*. Is *that* hard to remember? Well—here goes:

"PROBLEM" 18: (Figure 69) *Through any given point to direct a line to the "lost" or inaccessible center of a given circular arc.*

Solution: I just can't say it—read the drawing. All three cases are shown! However, if the given point occurs at or near either *end* of the arc, this solution is inapplicable—for only one chord point could then be found in the manner indicated. In this extreme case, draw any other *two* radials and then utilize these to materialize the required one by solving Problem 16 heretofore given.

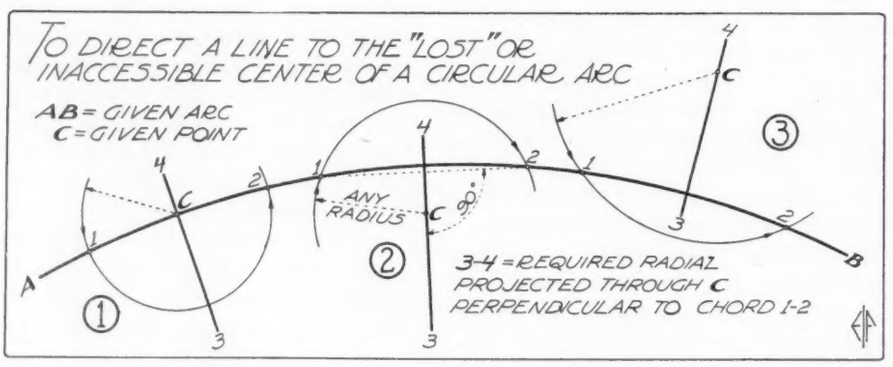


FIGURE 69

PENCIL POINTS FOR FEBRUARY, 1930
VOLUME XI NUMBER 2

This lithograph, measuring 12¼" x 18½" in the original, was drawn during the artist's travels as holder of the Rotch Travelling Scholarship. It is a powerful subject, simply presented, and expresses something of the colossal dignity of Egyptian architecture.

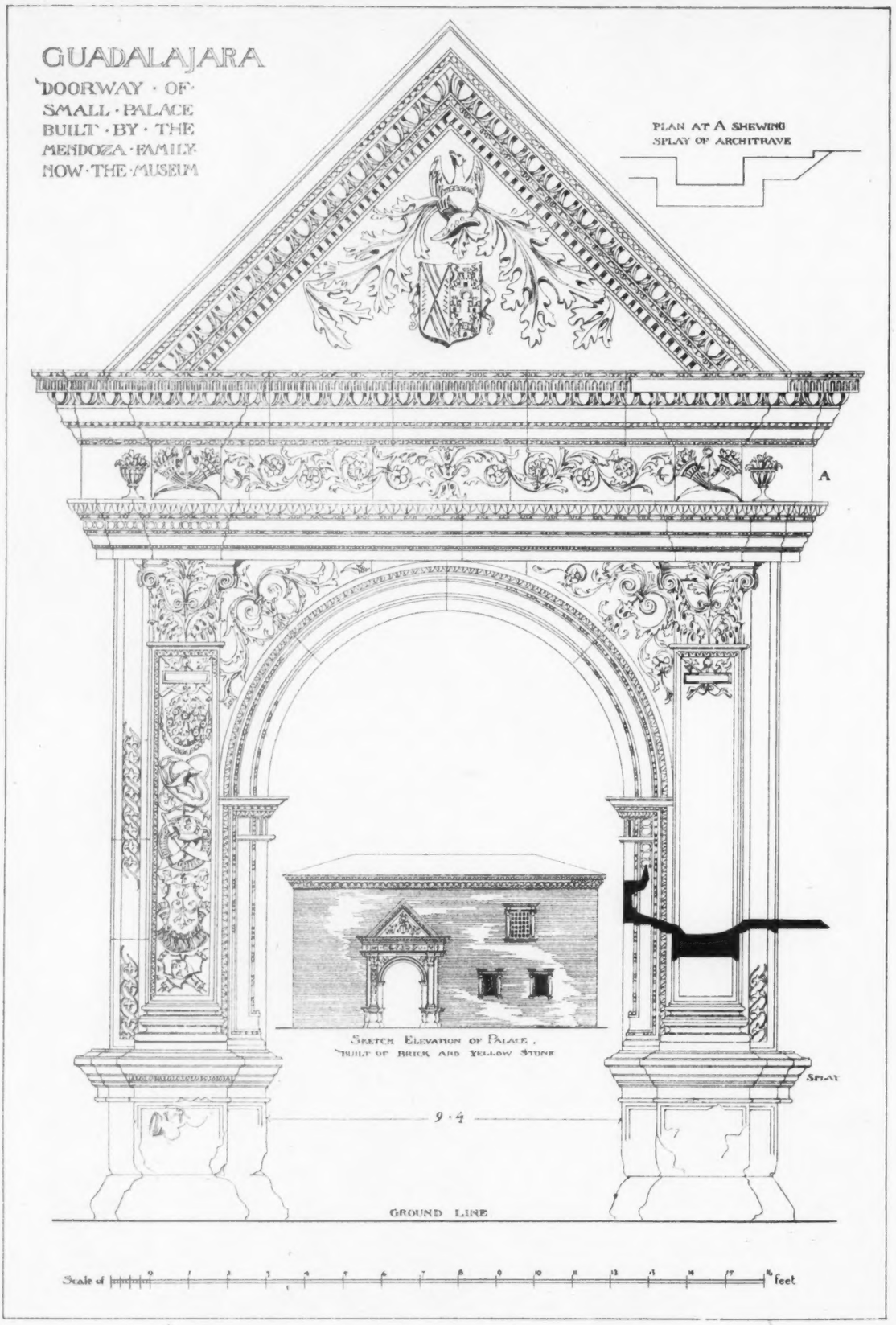
FROM A LITHOGRAPH BY LOUIS SKIDMORE

THE PORTAL AT EDFU

PENCIL POINTS FOR FEBRUARY, 1930
VOLUME XI NUMBER 2

"Although situated in the center of the city, this palace seems to be little known. The doorway given on this plate is to be found in a disused courtyard, and must originally have formed the principal entrance to the palace."

A. N. PRENTICE.

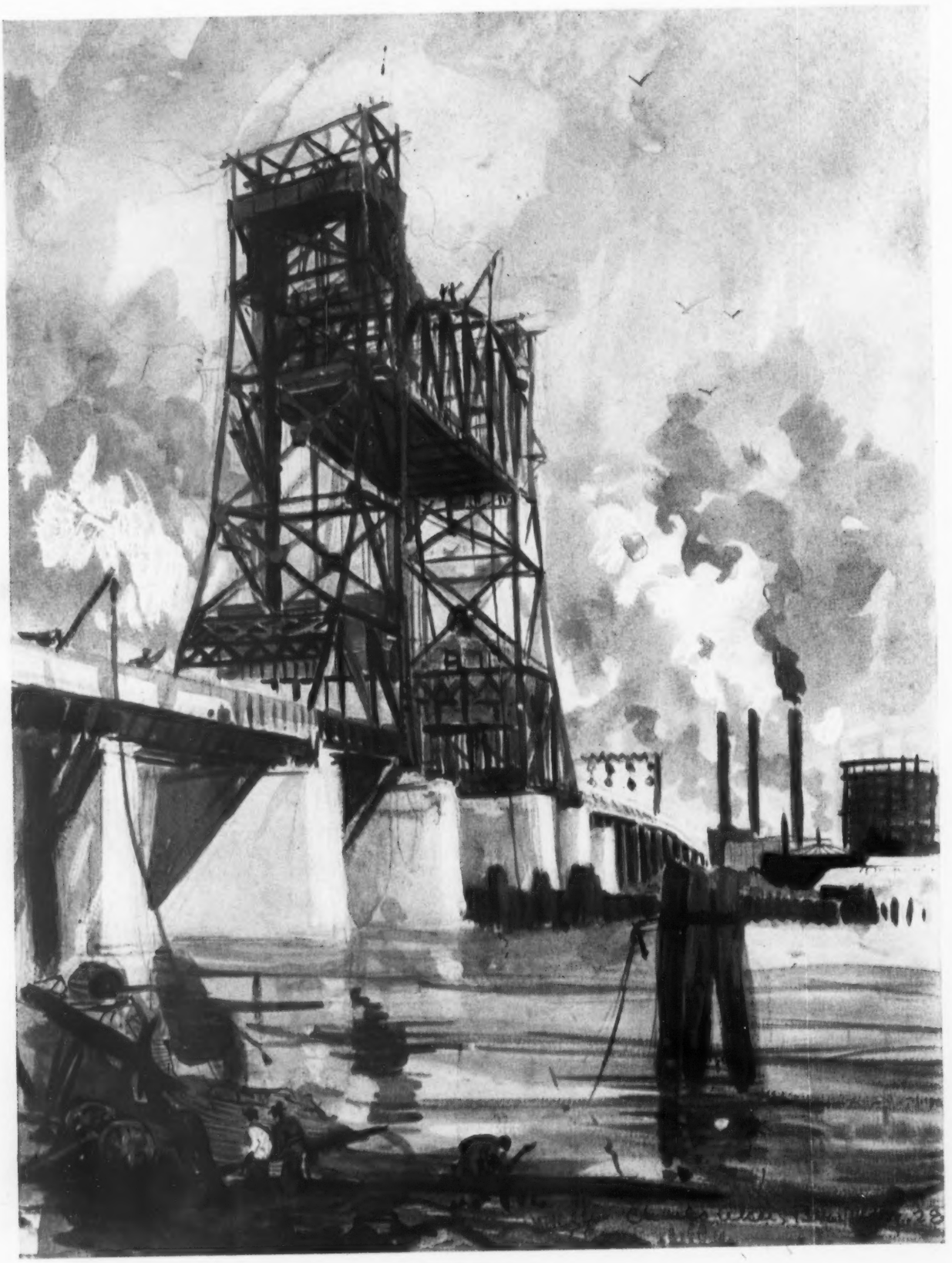

GUADALAJARA
DOORWAY · OF · SMALL · PALACE · BUILT · BY · THE · MENDOZA · FAMILY · NOW · THE · MUSEUM
PLAN AT A SHEWING SPLAY OF ARCHITRAVE
A
SPLAY
SKETCH ELEVATION OF PALACE. BUILT OF BRICK AND YELLOW STONE
9·4
GROUND LINE
Scale of feet

RENAISSANCE ARCHITECTURE AND ORNAMENT IN SPAIN

A PLATE FROM THE WORK BY ANDREW N. PRENTICE

PENCIL POINTS SERIES
of
COLOR PLATES

This water-color sketch was made direct from nature with a combination of transparent and tempera colors. The subject is on the Jersey meadows on the way from New York to Newark and in the words of the artist this territory is a rich field for a painter who is looking for scenes of human industry in the rough. There are undoubtedly such subjects to be found near any one of our American industrial cities. The use of chrome orange and vermilion in the sky is unusual but it seems in tune with the rest of the composition. The original drawing measured 10½" x 13¾".



"THE STEEL BRIDGE"

FROM A WATER COLOR SKETCH BY CHARLES A. BRADBURY

RESIDENCE OF HERMAN VAN FLEET, ESQ., SCARSDALE, NEW YORK—EUGENE J. LANG, ARCHITECT

FROM A WATER COLOR RENDERING BY J. FLOYD YEWELL

PENCIL POINTS SERIES
of
COLOR PLATES

Mr. Yewell's familiar, clean-cut, and direct style of rendering in transparent water color is clearly shown by this subject which presents an extremely successful stone residence designed by Eugene J. Lang. The tree and the foreground shadows in cool tones are admirably arranged to enframe the house and its immediate surroundings which are expressed in bright sunny colors. The original, which measured 12" x 16", was made on Canson and Montgolfier's "Lavis" paper. The principal colors used were Raw Sienna, French Blue, Aureolin, Antwerp Blue, Burnt Sienna, and Rose Madder.

Courtesy Goodspeed's, Boston

FROM A DRYPOINT BY SAMUEL CHAMBERLAIN

BOSTON FISH PIER

PENCIL POINTS FOR FEBRUARY, 1930
VOLUME XI NUMBER 2

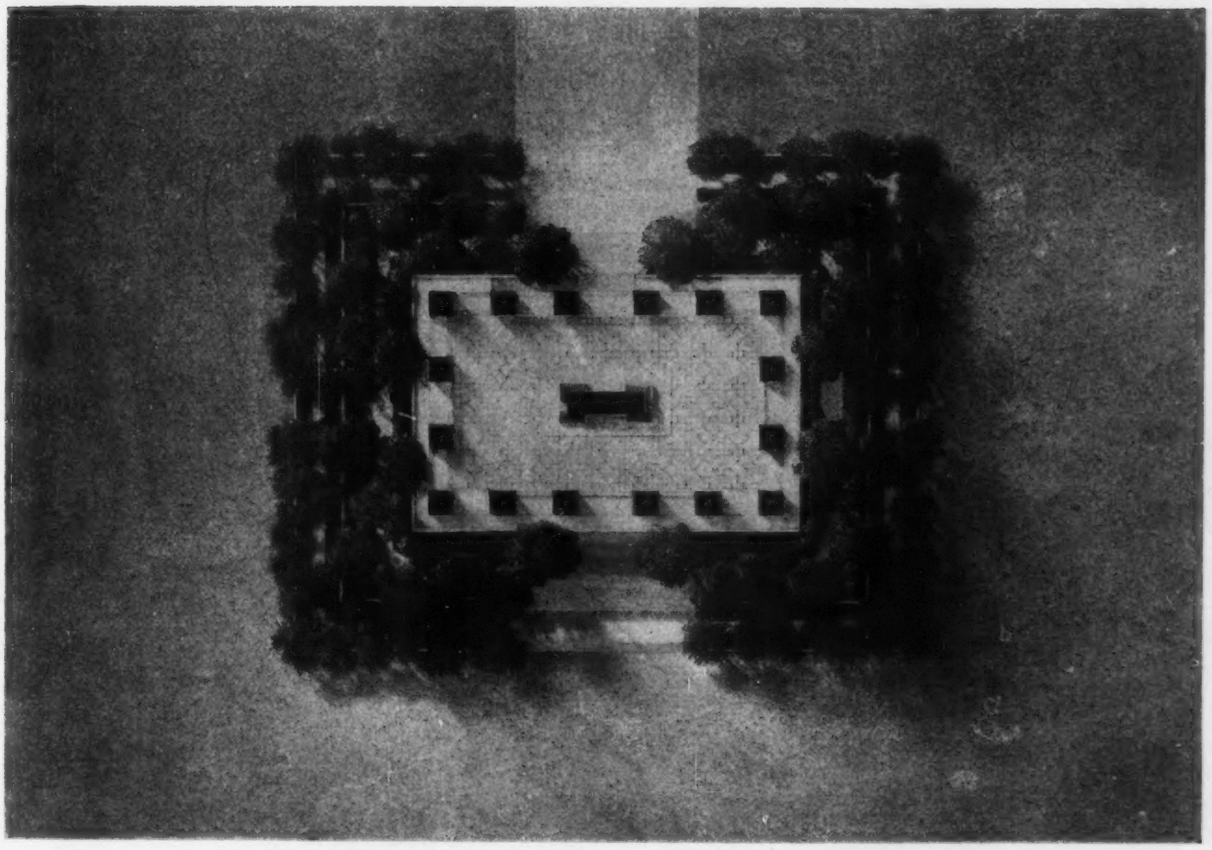
On the other side of this sheet we have reproduced another Boston drypoint by Samuel Chamberlain. It is shown at the exact size of the original print. The subject calls to mind that the waterfront districts of our coastal cities afford a rich field for the sketcher—one which architects and architectural draftsmen would do well to investigate.

FROM PAINTINGS BY FRANK H. SCHWARZ FOR MAGINNIS AND WALSH, ARCHITECTS

SAINTS FOR RIGHT WING OF REREDOS, CHURCH OF THE ASCENSION, WESTMONT, CANADA

PENCIL POINTS FOR FEBRUARY, 1930
VOLUME XI NUMBER 2

These paintings were done in egg tempera with a background of burnished gold with engraved ornament. The colors are pure and high in key. The robe of St. John the Baptist is rose madder and that of St. Andrew is deep blue on the original paintings. St. Theresa's costume is brown and cream with a black veil. The figures are about five feet high. The artist's admirable pencil studies for these figures are shown elsewhere in this issue.



PLAN OF FIRST PRIZE DESIGN BY ERIC GUGLER AND ROGER BAILEY

CHICAGO WAR MEMORIAL COMPETITION

THE WAR MEMORIAL COMMITTEE of the City of Chicago proposes to erect a memorial dedicated to those who served in the great World War. It will occupy a most important position on the shore of Lake Michigan and at the termination of Congress Street, the principal axis of the city of the future. It is the desire of the Committee to obtain a design which, when built, will adequately memorialize the sacrifices and services of all who served in the war and in a manner relating not inharmoniously to the adjacent architectural and landscape elements of Grant Park and the Yacht Harbor.

The Committee desires to erect a memorial of superlative significance and beauty, fully expressive of the City's gratitude to those who served in the great war and of a size and impressiveness appropriate to its site, which is of major importance. With this objective in mind, no cubic limit was laid down in the program. Attention was called, however, to the fact that there are practical limits to the amount of money which can be devoted to a war memorial and each competitor was asked, therefore, to bear in mind the relation of the probable final cost of his design with those of the war memorials in other great American cities.

The competitors were referred to a plat which indicated the development of Grant Park, present and future, and to which the war memorial will be related. Necessary grades, heights, and information concerning the present physical appearance of the site and its surroundings were furnished the competitor.

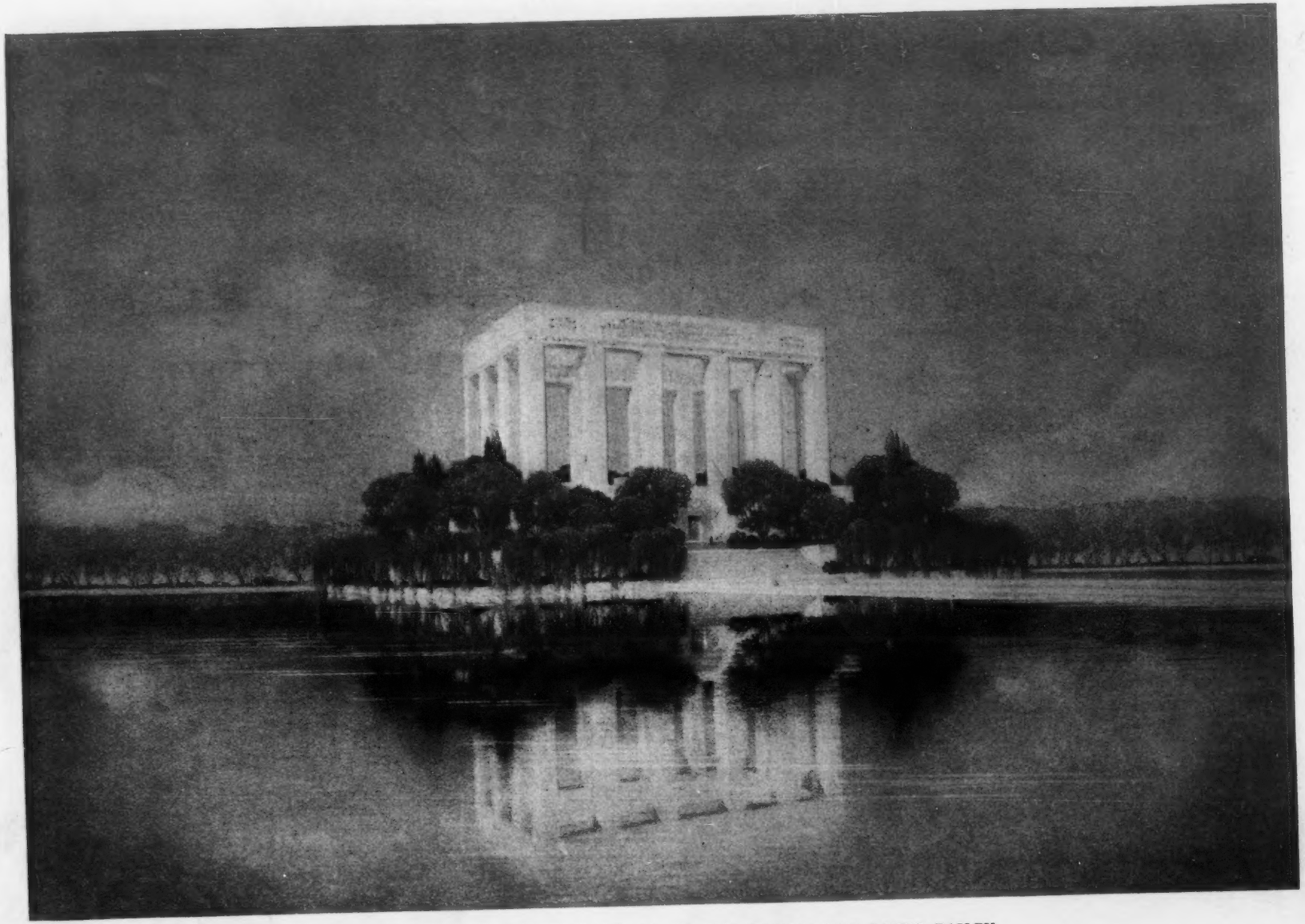
Competitors were informed of the fact that numerous injunctions had been issued in the past preventing the erection of buildings in Grant Park intended for various purposes, but that several decorative structures, such as the Buckingham Fountain, Entrance Pylons, and so on, had been permitted. Nothing in the program was to be interpreted as indicating a preference for any particular scheme. On the contrary the Committee wished that the Jury be given opportunity of the broadest possible choice.

The Jury of Award consisted of the following lay members: W. Rufus Abbott, Col. Robert R. McCormick, Col. Howard P. Savage, James Simpson, and Col. Albert A. Sprague; and the following architects: Harvey W. Corbett, Ernest R. Graham, John Mead Howells, and Dean Everett V. Meeks.

A prize of $20,000 will be paid the winner of the competition; for the second prize design a cash prize of $5,000 will be paid.

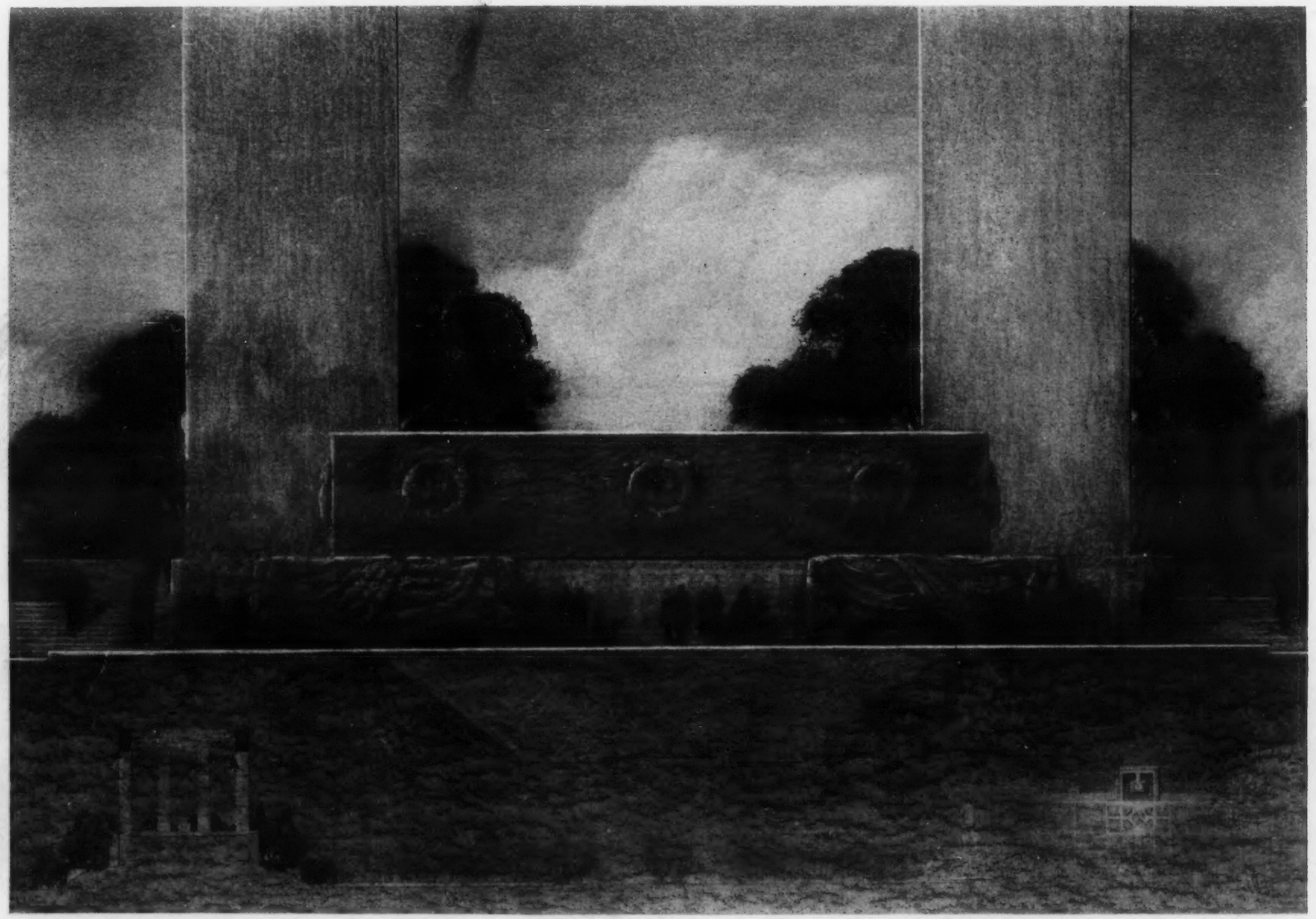
The winning design is shown above and on the following pages, as well as some of the other designs submitted in the competition.

A complete report of the Jury of Award was published on page 45 of the January PENCIL POINTS.

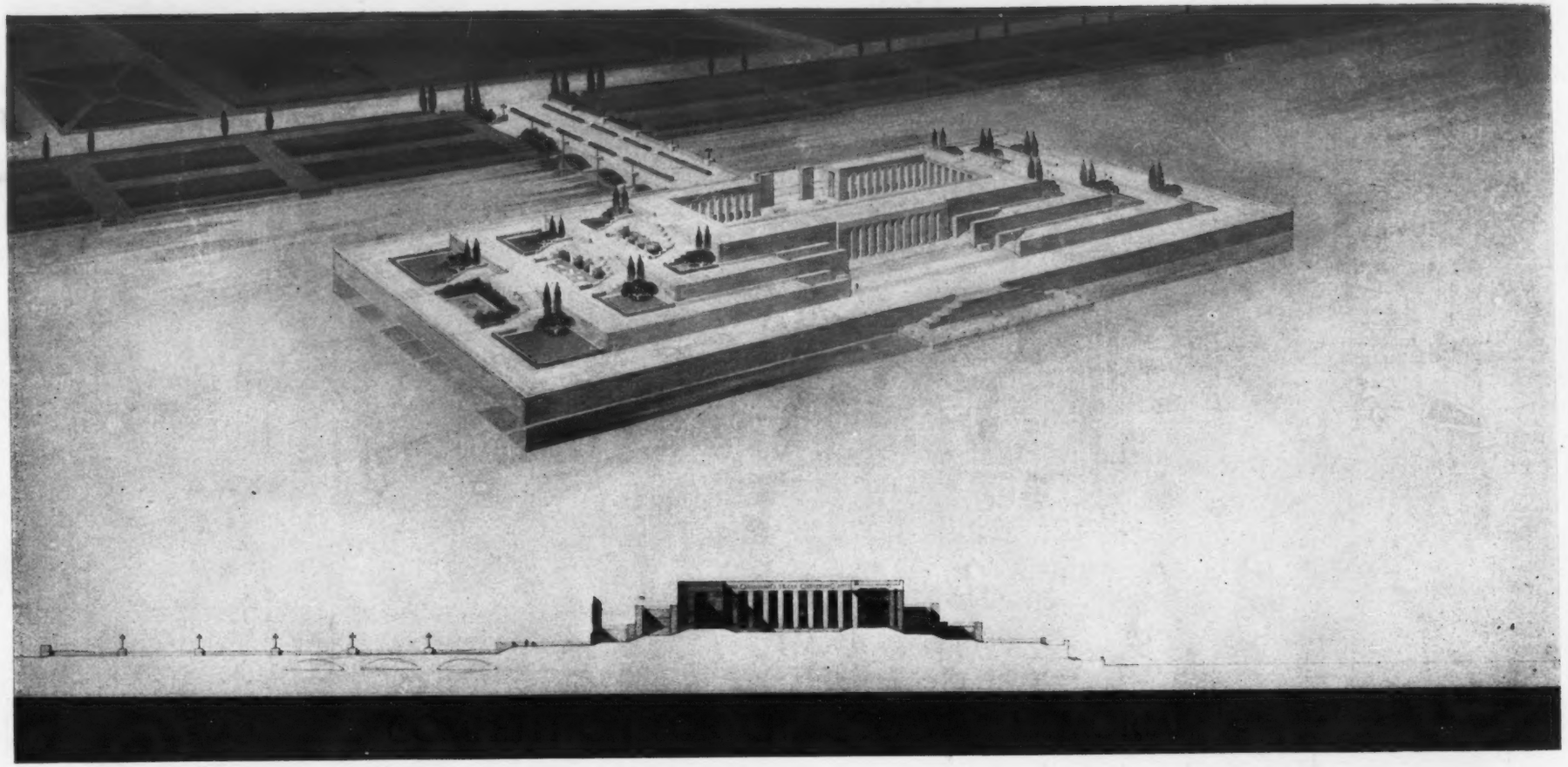


PERSPECTIVE OF FIRST PRIZE DESIGN BY ERIC GUGLER AND ROGER BAILEY
WAR MEMORIAL COMPETITION FOR THE CITY OF CHICAGO

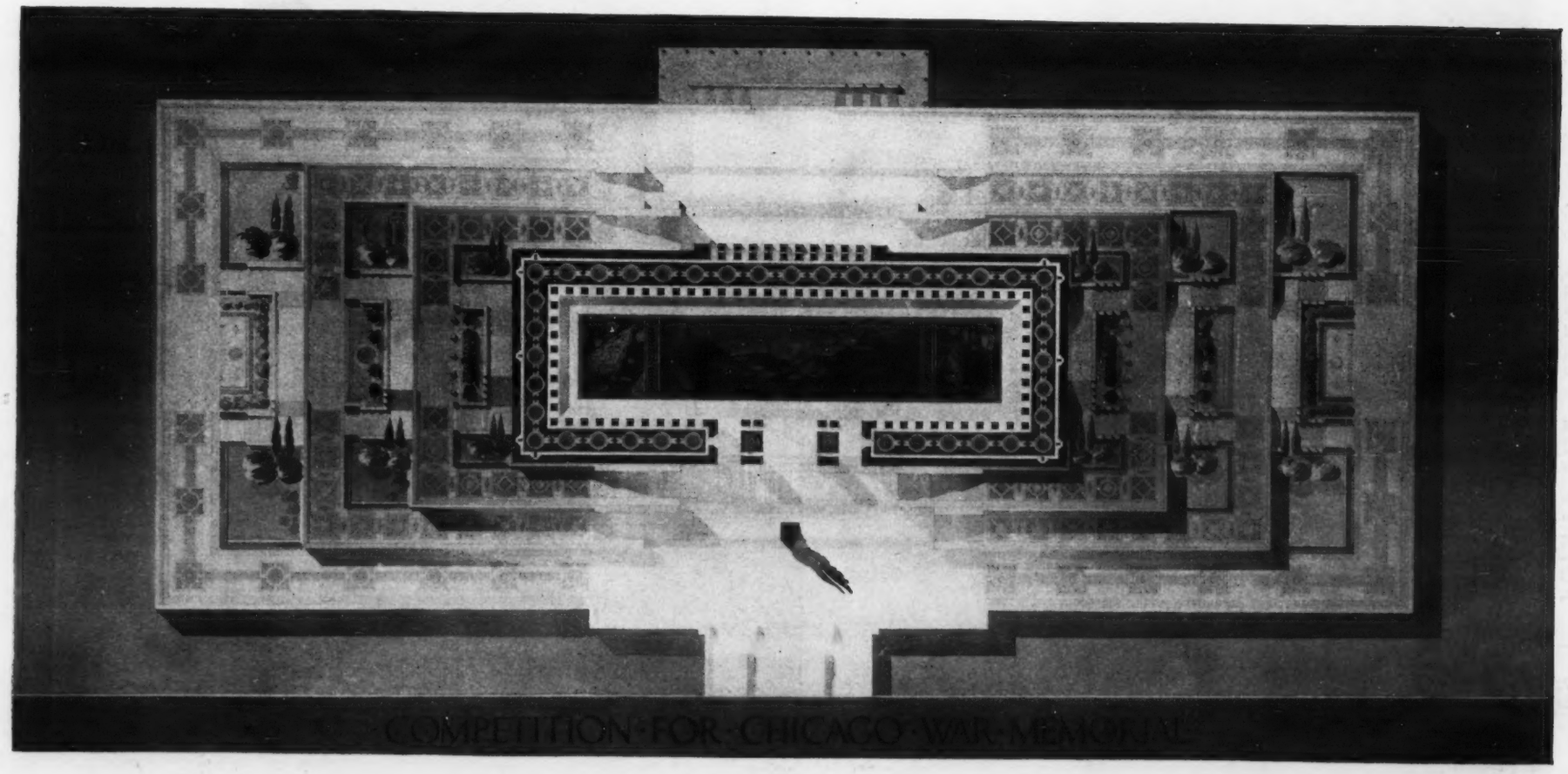
WAR MEMORIAL COMPETITION FOR THE CITY OF CHICAGO



DETAIL OF SARCOPHAGUS, FIRST PRIZE DESIGN BY ERIC GUGLER AND ROGER BAILEY
WAR MEMORIAL COMPETITION FOR THE CITY OF CHICAGO

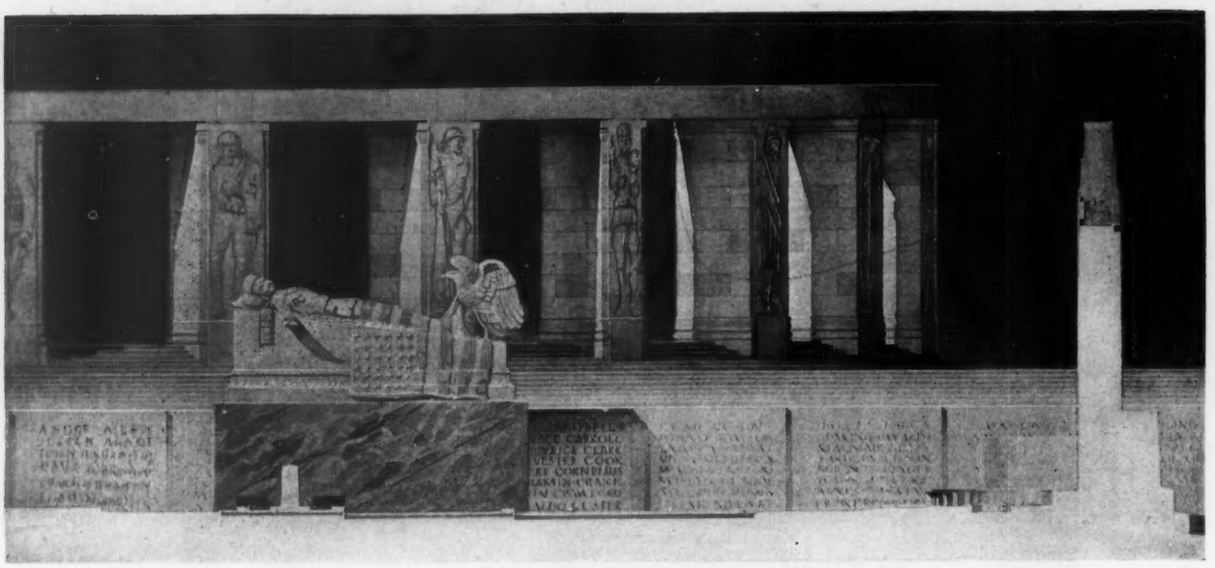


PERSPECTIVE OF SECOND PRIZE DESIGN BY BENJAMIN H. MARSHALL
WAR MEMORIAL COMPETITION FOR THE CITY OF CHICAGO



PLAN OF SECOND PRIZE DESIGN BY BENJAMIN H. MARSHALL

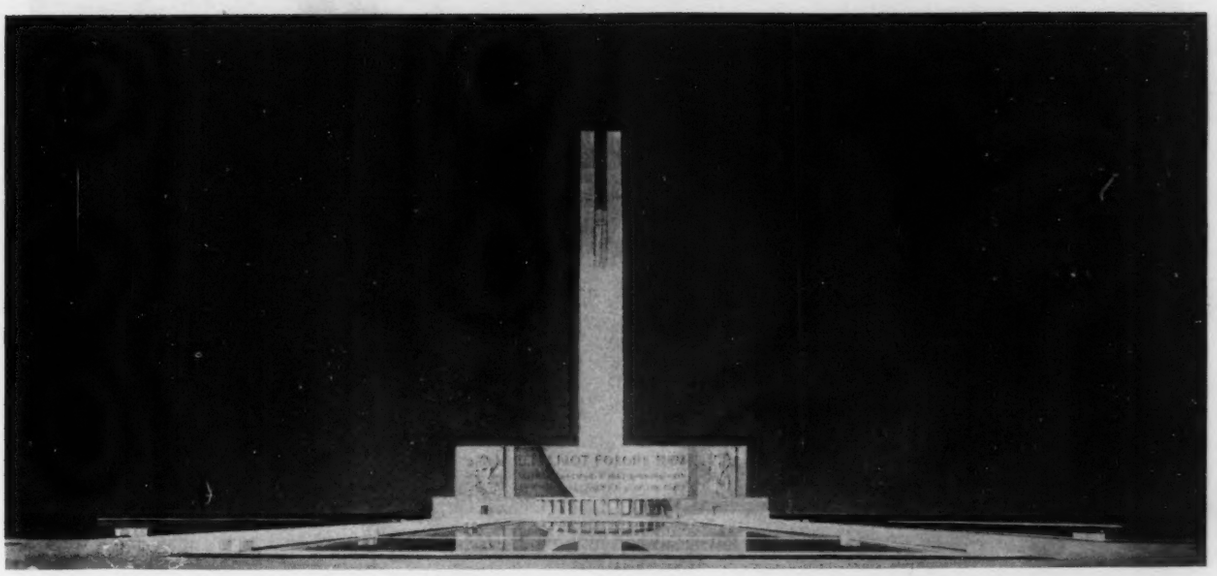
WAR MEMORIAL COMPETITION FOR THE CITY OF CHICAGO



DETAIL OF DESIGN SUBMITTED BY LIONEL H. PRIES

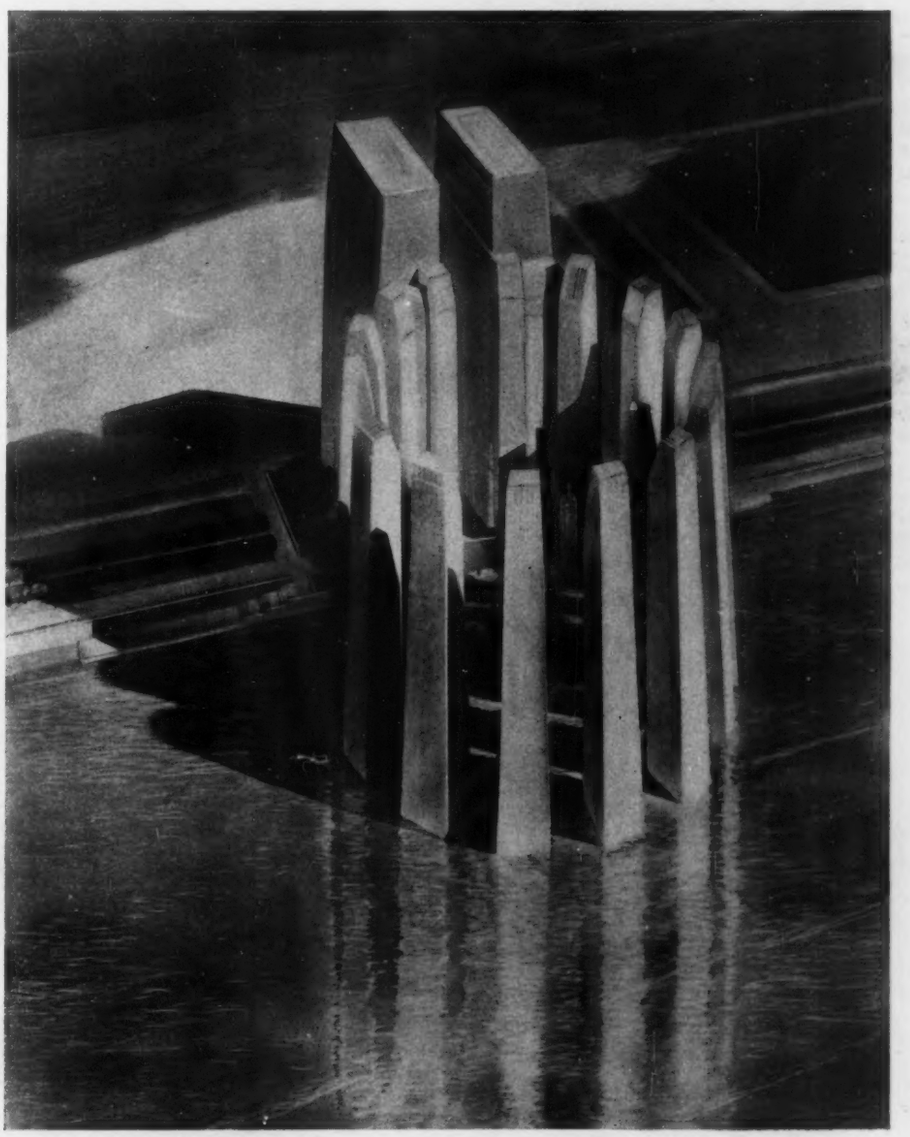
DETAIL OF DESIGN SUBMITTED BY RAYMOND M. HOOD, GODLEY, AND FOUILHOUX

WAR MEMORIAL COMPETITION FOR THE CITY OF CHICAGO



ELEVATION OF DESIGN SUBMITTED BY LIONEL H. PRIES

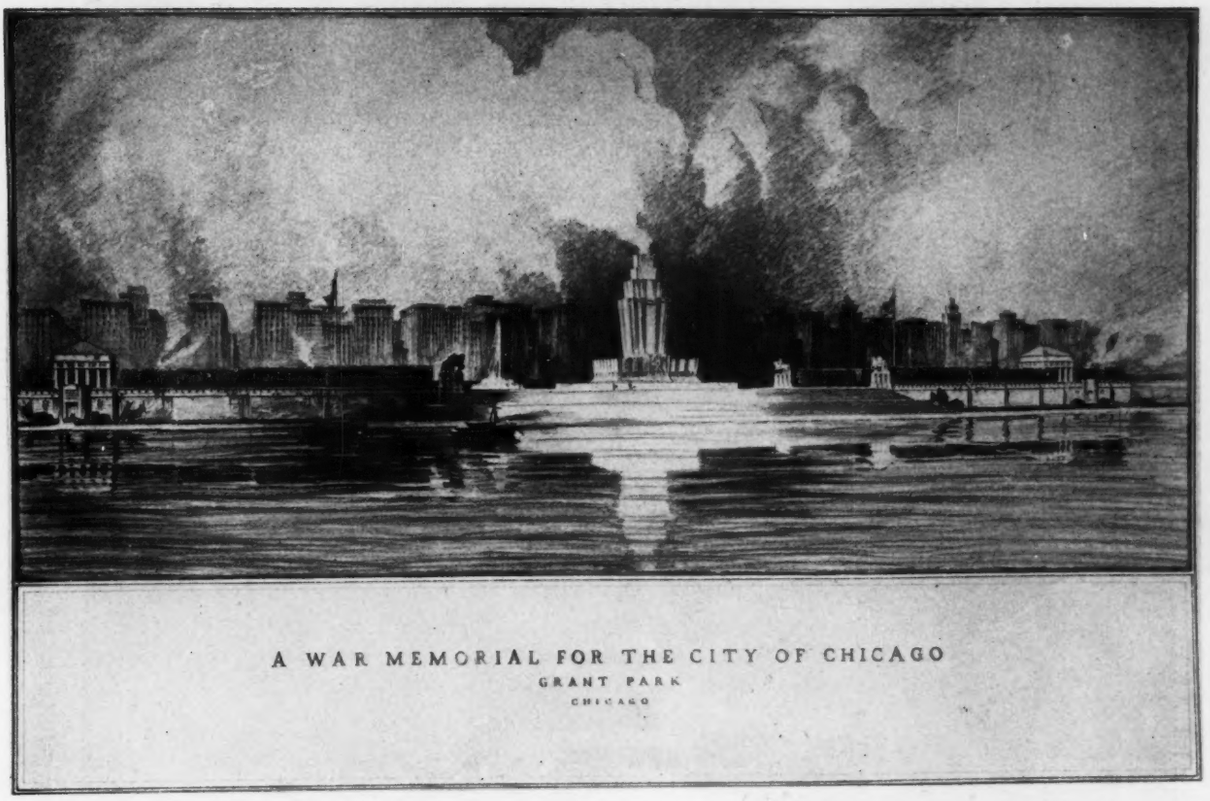
PERSPECTIVE OF DESIGN SUBMITTED BY RAYMOND M. HOOD, GODLEY, AND FOUILHOUX



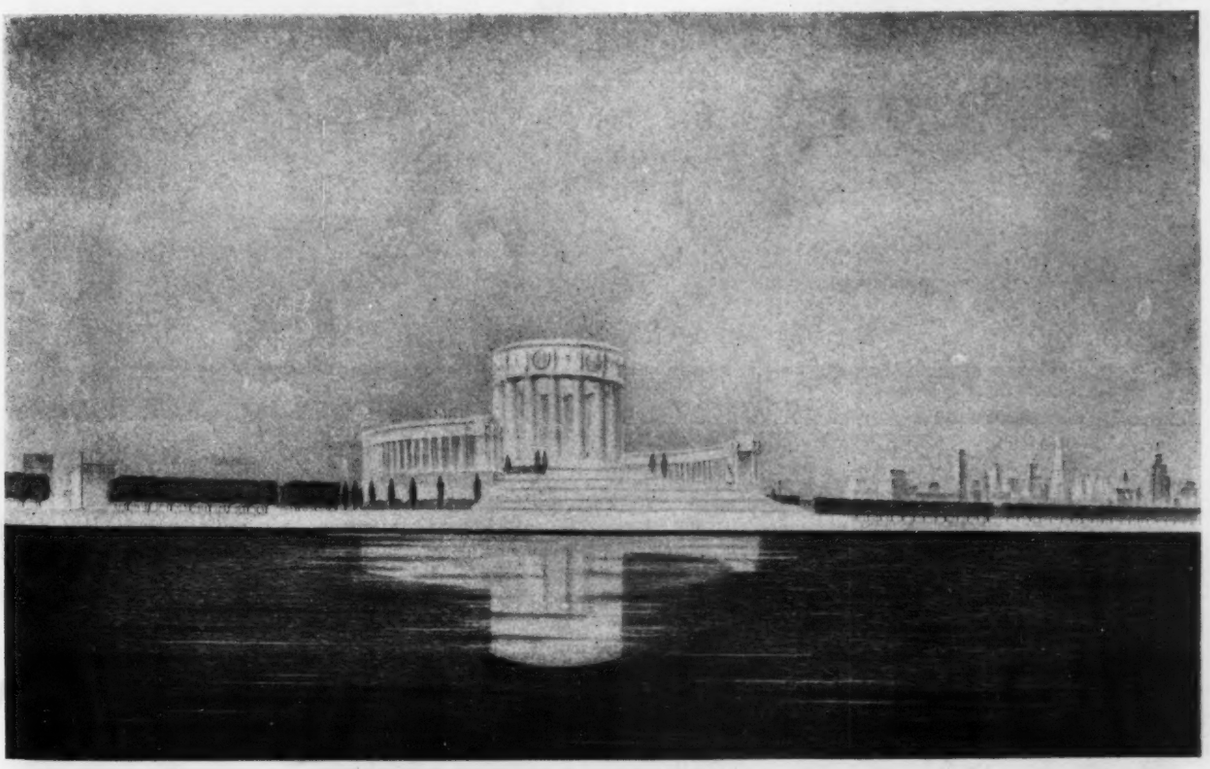
WAR MEMORIAL COMPETITION FOR THE CITY OF CHICAGO

PERSPECTIVE OF DESIGN SUBMITTED BY HAMILTON, FELLOWS, AND NEDVED

WAR MEMORIAL COMPETITION FOR THE CITY OF CHICAGO



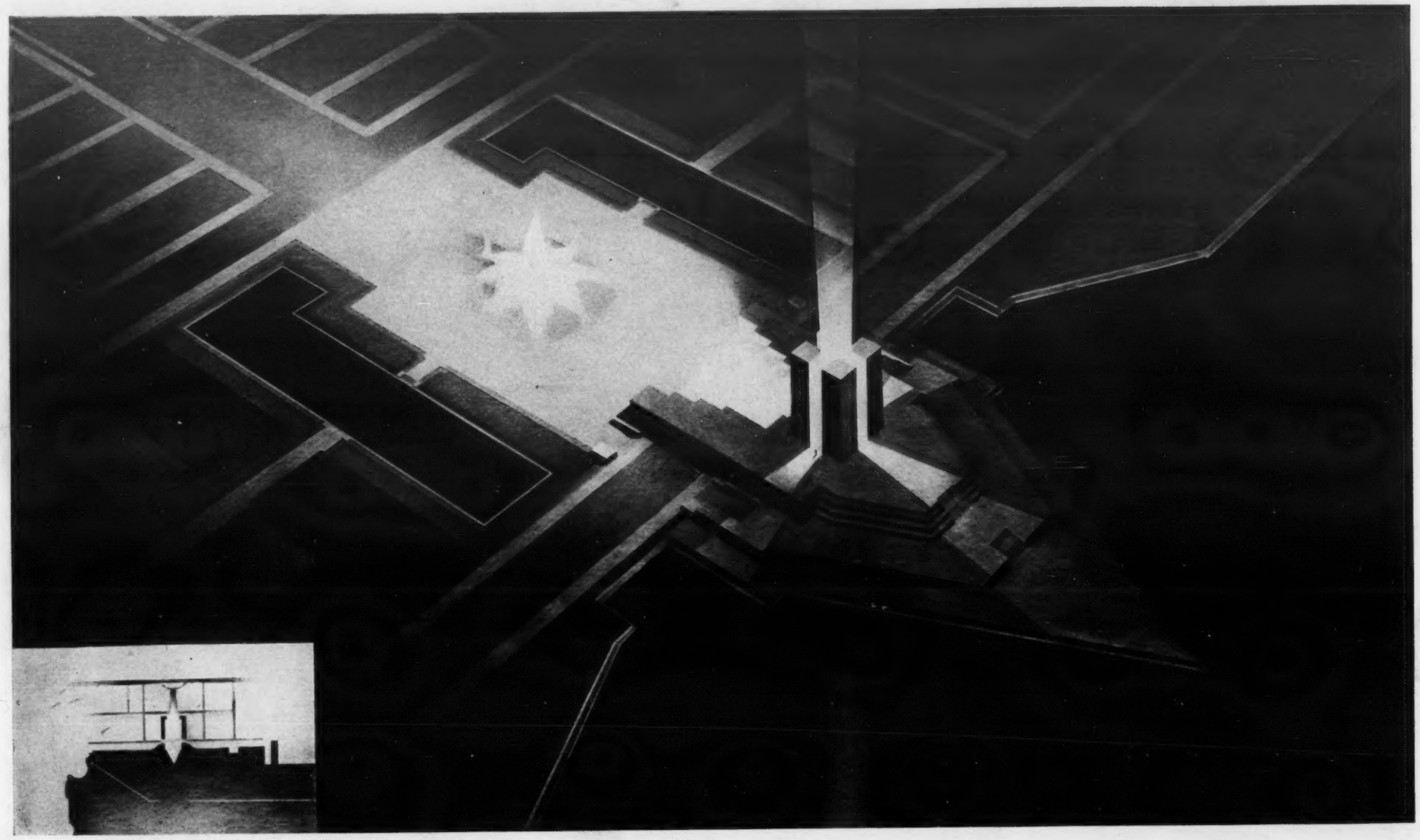
PERSPECTIVE OF DESIGN SUBMITTED BY LORIMER RICH



PERSPECTIVE OF DESIGN SUBMITTED BY SYLVESTER MAR

WAR MEMORIAL COMPETITION FOR THE CITY OF CHICAGO

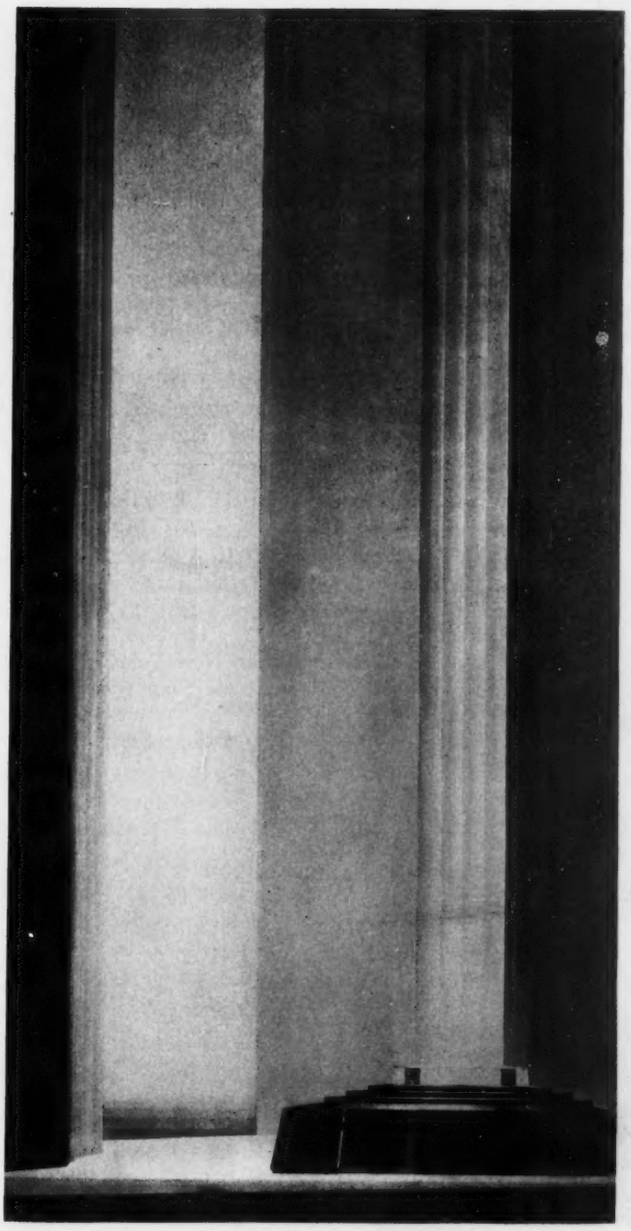
PERSPECTIVE OF DESIGN SUBMITTED BY [illegible]
WAR MEMORIAL COMPETITION FOR THE CITY OF CHICAGO



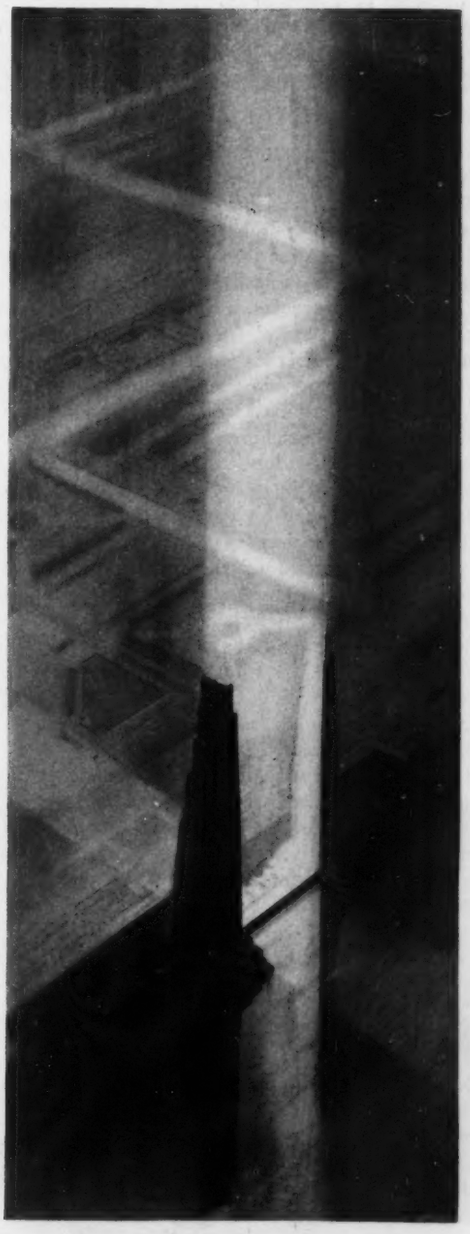
PERSPECTIVE OF DESIGN SUBMITTED BY HOLABIRD AND ROOT

WAR MEMORIAL COMPETITION FOR THE CITY OF CHICAGO

DETAIL OF DESIGN BY BENNETT, PARSONS, AND FROST—DONALD NELSON AND EDGAR LYNCH, ASSOCIATES
(See perspective below)



DETAIL OF DESIGN BY HOLABIRD AND ROOT



PERSPECTIVE, DESIGN BY ABOVE ARCHITECTS

WAR MEMORIAL COMPETITION FOR THE CITY OF CHICAGO

COMPETITION FOR TWO SCHOLARSHIPS

Two SCHOLARSHIPS of four hundred dollars each are offered in the academic year 1930-31 for *special students* in the third or the fourth year of the course in Architecture at the Massachusetts Institute of Technology. They will be awarded as the result of a competition in design under the direction of the Committee on Design in the Department of Architecture.

The competition is open to citizens of the United States of good character, who are between twenty-one and twenty-eight years of age, and who have had at least three years of office experience.

The competition will be held from May 17 to May 26.

Competitors are allowed to prepare their drawings wherever conditions conform to the requirements of the Committee, but these drawings must be sent to Boston for judgment.

Applications should be received on or before April 14, addressed to Professor William Emerson, 491 Boylston Street, Boston, Mass.

THE JAMES TEMPLETON KELLEY FELLOWSHIP IN ARCHITECTURE

A FELLOWSHIP WITH an income of $2,500 for one full year has been established by Mrs. James Templeton Kelley in memory of her husband. The Fellowship is to be administered by the Boston Society of Architects (a Chapter of the American Institute of Architects) and is to be assigned to an individual of proved ability, whether a student, an instructor, a draftsman, or a practicing architect, for foreign travel for the pursuit of advanced studies in architecture. It is open to any American man or woman residing within the area under the jurisdiction of the Boston Society of Architects (Maine, New Hampshire, Vermont, and Massachusetts) and is to be awarded annually on the basis of evidence submitted by the applicant, and otherwise secured by the Committee on Education of the Boston Society of Architects. The Executive Committee of the Boston Society of Architects makes the award on the recommendation of the Committee on Education of the Society. The holder is eligible for re-appointment. If, in any year, no suitable candidate appears, the sum available is to be set aside as a separate fund which may be used to defray expenses incurred in publishing the results of the work produced by any of the James Templeton Kelley fellows, or for other purposes connected with the Fellowship. In any year, the Committee may reserve a part of the income, not exceeding $500, to defray expenses incurred in the administration of the Fellowship.

Applications for the year 1930 should be in the hands of J. Lovell Little, Chairman of the Committee on Education of the Boston Society of Architects, 20 Newbury Street, Boston, on or before January 20, 1930.

COMPETITION FOR THE A. W. BROWN TRAVELLING SCHOLARSHIP

ANNOUNCEMENT IS MADE of the third competition for the selection of a beneficiary for the A. W. Brown Travelling Scholarship, this competition to be held under the direction of a committee of the American Institute of Architects. Programs will be mailed to approved applicants about March 14th, 1930, drawings to be delivered on or about April 14th, 1930.

This Scholarship is the gift of Ludowici-Celadon Company and is a memorial to the late A. W. Brown, who was for many years president of that company.

The value of the scholarship is Two Thousand Dollars, to be used towards defraying expenses of a year of travel and study in Europe by a worthy and deserving architect or architectural draftsman. Travelling expenses between the winner's place of residence and the port of New York will be paid in addition to this amount.

An award of Two Hundred and Fifty Dollars will be made to the person whose design is placed second in the competiton; One Hundred and Fifty Dollars to the person whose design is placed third; and One Hundred Dollars to the person whose design is placed fourth.

Under the terms of the gift the selection of the beneficiary of this scholarship is to be made by means of a competition to be held under the direction of a committee of the American Institute of Architects, the drawings to be judged by a jury of from three to five practicing architects chosen by that committee. The general requirements of the problem given for the competition will be similar to those of the Class A problems issued by the Beaux-Arts Institute of Design. In making the award of the scholarship the committee will give due consideration to the personal qualifications of the competitors as well as the excellence of the designs as judged by the jury.

It is also stipulated by the donors that the competition shall be open to any architect or architectural draftsman who is a citizen and resident of the United States; who has never been the beneficiary of any other European scholarship; who has passed his twenty-second but has not passed his thirty-second birthday on May 1st, 1930; and who has been in active practice or employed in the offices of practicing architects for at least six years, or, if a graduate of an architectural school, at least two years since graduation.

Those wishing to compete should write for application blanks to the secretary of the committee, Wm. Dewey Foster, 25 West 45th Street, New York.

NOTES FROM DETROIT

FEW CHANGES IN position of teams have been made since we last heard from the Detroit Architectural Bowling League. If the boys continue to roll as consistently during the second half of the season, no doubt the lineup at the finish will be very similar to that given below.

We have heard nothing from New York or Cleveland this year. Where, oh, where are those wandering boys tonight?

The team standings on Jan. 10th follow:

	W.	L.
McGrath & Dohmen	34	14
Robert O. Derrick, Inc.	31	17
Albert Kahn	30	18
Mueller & Krecke	27	21
Smith, Hinchman & Grylls	24	24
Weston & Ellington	22	26
Donaldson & Meier	21	27
Malcomson & Higginbotham	19	29
Van Leyen, Schilling & Keough	18	30
Louis Kamper	14	34

High Individual Score—1 game — Thompson (A. K.)	267
High Individual Score—3 games— Stegkamper (L. K.)	657
High Team Score—1 game — Albert Kahn	1052
High Team Score—3 games— McGrath & Dohmen	2864

THE COLORED LIGHTING OF THE BARCELONA EXPOSITION

By C. J. Stahl
Member of the Illuminating Engineering Society

THE COLORED FLOODLIGHTING of the International Exposition at Barcelona, Spain, is notable as viewed in its co-ordinated qualities, or in *parti*. The art of painting with light is far from being fully cultivated and applied. However, a sensitive appreciation of its potentialities is growing, and apparently on sound judgment.

Fortunately, those specializing in artificial illumination often perform their duties in collaboration with architects and artists and few, if any, glaring misapplications of colored lighting on a large scale are to be found. Architects in general may be said to be somewhat reticent on the use of artificial colors in the floodlighting of buildings. This disposition is natural and not difficult to understand.

Traditions and established custom must not be encroached. Without restraint, the enthusiasm engendered as one becomes intimate with the subject, easily flames into over-enthusiasm, prolific of blunders. On the whole, moderate restraint is respectfully accepted by the experienced illuminating specialist, who realizes that it tends to a healthy condition in the long run.

The artist who treats with more abstract forms and less with structural composition, on the other hand, is usually quite ready to apply colored light generously and apparently finds no great need for caution or great conservatism to keep within the bounds of æsthetic propriety.

Whatever may be the true use of colored light to building exteriors, it is certain that building owners are becoming enthusiastic and easily convinced on the relatively meagre evidence already extant in most of our large cities. And whatever the architect's viewpoint may be, it is assured that an opportunity to view the lighting of the Barcelona Exposition proves a gratifying experience. This is true with regard to the colored lighting of façades, as well as the beautiful mobile colors of the cascades, fountains, and many of the other decorative elements.

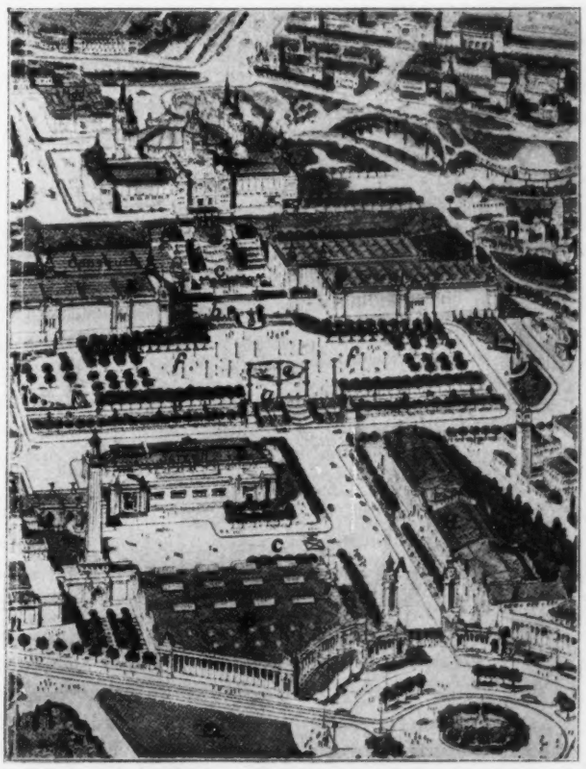


FIGURE 1—BIRD'S-EYE VIEW OF ABOUT ONE-FOURTH OF THE EXPOSITION GROUNDS

The International Exposition at Barcelona, Spain, features mobile color lighting on a scale several times larger than any similar display hitherto produced. This is true both as to the quantity of colored light employed and the extent of the area over which co-ordinated sequence in the color changes is maintained. Those who visit the Barcelona Exposition see an exceedingly beautiful spectacle of outdoor color lighting never before approached from the standpoint of widespread synchronized mobility both as to colors and intensities.

The exhibition site is on the gently sloping side of Montjuich immediately on the outskirts of the city of Barcelona. It is on the side towards the city and at an elevation considerably higher than most of the area within the city limits, so from almost any position within this large city of 1,000,000 population the beauty of the exhibition's lighting may be seen each night. The opposite side of the mountain falls off rather precipitously into the blue expanse of the Mediterranean.

A bird's-eye view of approximately one-fourth of the Exposition grounds is seen in Figure 1, which is here included to show only the central area or main avenue of the Exposition, since in this central area the major color effects are found. From the entrance to the National Palace is a distance of 600 meters and in width the avenue varies from 65 meters to 300 meters at the point where it widens out into a colorful plaza.

At the bottom of Figure 1 is the Plaza Espagne, where for one peseta — about fifteen cents at present exchange —one enters through the massive stone gateway and proceeds up the Avenida de Americas which is flanked with palatial structures housing exhibits. There are in all fourteen palatial buildings on the Exposition grounds. At the upper end of the Avenida de Americas is Cascade No. 1. Ascending the stairs at either side

FIGURE 2—DAY VIEW OF CASCADE NUMBER ONE

we reach the extensive Plaza de Bellas Artes with the Great Fountain at *e*. At points *ff* are two secondary fountains. Next we come to Cascade No. 2 at *b*. Ascending the stairs here we reach a terraced space in two levels with the Palace of Alfonso XIII on the left and the Palace of Queen Victoria on the right. Farther on is Cascade No. 3 at *c* and Cascade No. 4 at *d*. Between the two is a space of 40 meters with esplanades to right and left. Overtowering all this central area is the beautiful National Palace.

This central area presents a colorful panorama consisting of cascades, fountains, glass ornaments, transilluminated. There are also many luminous urns as well as flower and incense pots.

The composite effect cannot be comprehended in a word picture but in its essential parts it consists of the following:

1. There is an aurora of searchlight beams from twenty-four 36″ 150-ampere searchlights placed back of the dome of the National Palace.

2. There are four cascades which are illuminated in mobile colors so that the color seems to flow down like the water that carries it but slower.

3. There are more than fifty fountains all fully illuminated and controlled so that color changes may be synchronized with the changing colors of the cascades.

4. There are approximately two hundred glass columns of various shapes and in addition many urns, flower pots and fire pots most of which can be synchronized in like manner.

5. The façades skirting the area are illuminated in white light or colors, at choice.

6. In the top of the tower *A* at the entrance is the central control station for all mobile lighting. This is the nerve center from which through three underground substations all control circuits radiate. Substation No. I is to the left of the center of the Avenida de Americas. Substation No. II is to the left between the second and third cascades and Substation No. III is under the right front corner of the National Palace.

Spain's greatest architects, engineers, and landscape gardeners joined hands in transforming the sloping exposition area into a series of terraced gardens where luxuriant trees, beautiful flower beds, fountains and statuary adorn the grounds on which are fourteen spacious structures to house the exhibits. Because of the inadequacy of words to describe the complete picture let us take an imaginary stroll from the front of the National Palace at the summit of the central area toward the Avenida de Americas.

Upon leaving the Palace entrance it is observed that the whole exterior of this imposing edifice is bathed in soft colors originating from sources not readily discovered. Being more than normally inquisitive, we find that about the Palace are standards, each bearing three banners. These banners are of luminous painted fabric and hung so that six floodlighting projectors, each with a 1000-watt lamp, are concealed, being shielded from view on three sides. These projectors furnish either blue, red, or white light, there

being two for each of these colors. This light is supplemented by light from many floodlights mounted in recesses and concealed by decorative stone work over the façades, the dome, and towers.

Assuming that at the moment the whole palace is flooded with blue light it soon becomes apparent that some change is taking place. The blue dawns into a lighter blue and gradually it becomes a delicate blue tint followed by a daylight blue effect as the white units reach "full bright." The bluish tint then completely disappears and a little later a pink suggestive of the evening sky creeps into the white and this slowly deepens as the red units are brought to full brightness and the white units are dimmed.

The floodlighting of façades, domes, and minarets is accomplished mostly by light directed upward. This creates shadows, and these, as well as small arches, niches and other architectural indentures are lighted from concealed sources, in soft contrasting colors to accentuate the architectural embellishments both by depth and color contrasts. Yellow, red, and light green are used most for this purpose.

Suddenly from back of the great central dome of the National Palace an aurora of colored searchlight beams fans out over the heavens. Twenty-four 36-inch, 150-ampere arc searchlights have come into action. These were specially designed to produce a far-flung canopy of colored light over the gorgeous lighting display confronting the observer when looking from the Palace in the direction of the Avenida de Americas. The aurora, of course, is seen to best advantage when viewed from the foot of this avenue. As the aurora radiates upward into the heavens, the ground display is a great stream of color consisting of the cascades, fountains, crystal columns, and the various other ornamental shapes constructed of paneled glass with lamps within. All are aglow with colored light, which progresses through consecutive dimming and brightening so that it seems to flow down the inclined central area. The effect is that of a mammoth staircase almost a half mile long illuminated with slowly moving waves of color. Blue, for example, starts from the National Palace at the top and moves slowly down. When the blue has gone 200 meters the effect of a mixture of red appears which gradually changes to pure red. Green follows and then white which holds until the advancing colors have reached the lower end of the Avenida de Americas, the time consumed being twelve minutes. By pressing a button at the central control station, the entire cycle is repeated. At this station one or more artists will supervise the composition of the almost endless variety of color combinations of which twenty may be set up in advance. Recalling that the color panorama of the central area takes in four cascades, three large fountains and more than fifty small ones as well as some two hundred or more glass ornaments, a most beautiful effect in mobile colors is produced. In addition, from the colored lighting of façades bounding the central area which can be carried forward in steps to co-ordinate with the mobile progression and from the changing aspects of the fountains due to great flexibility in hydraulic controls, we begin to picture a spectacle of supereminent beauty.

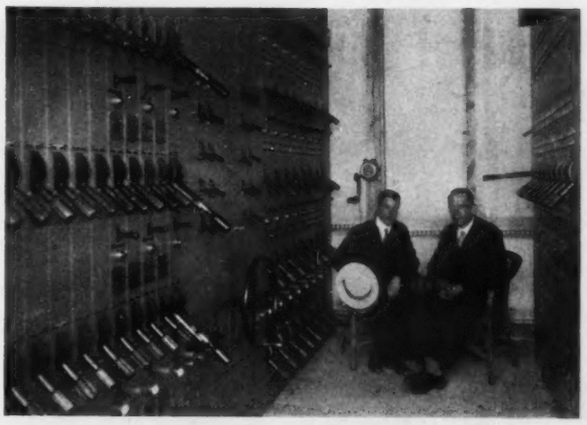


FIGURE 3—20 SCENE MULTI-PRESET SWITCHBOARD

Here are the artist's brushes, each for a given color, and applied to predetermined areas, but the stroke varies the color intensity by dimming or brightening the lamps.

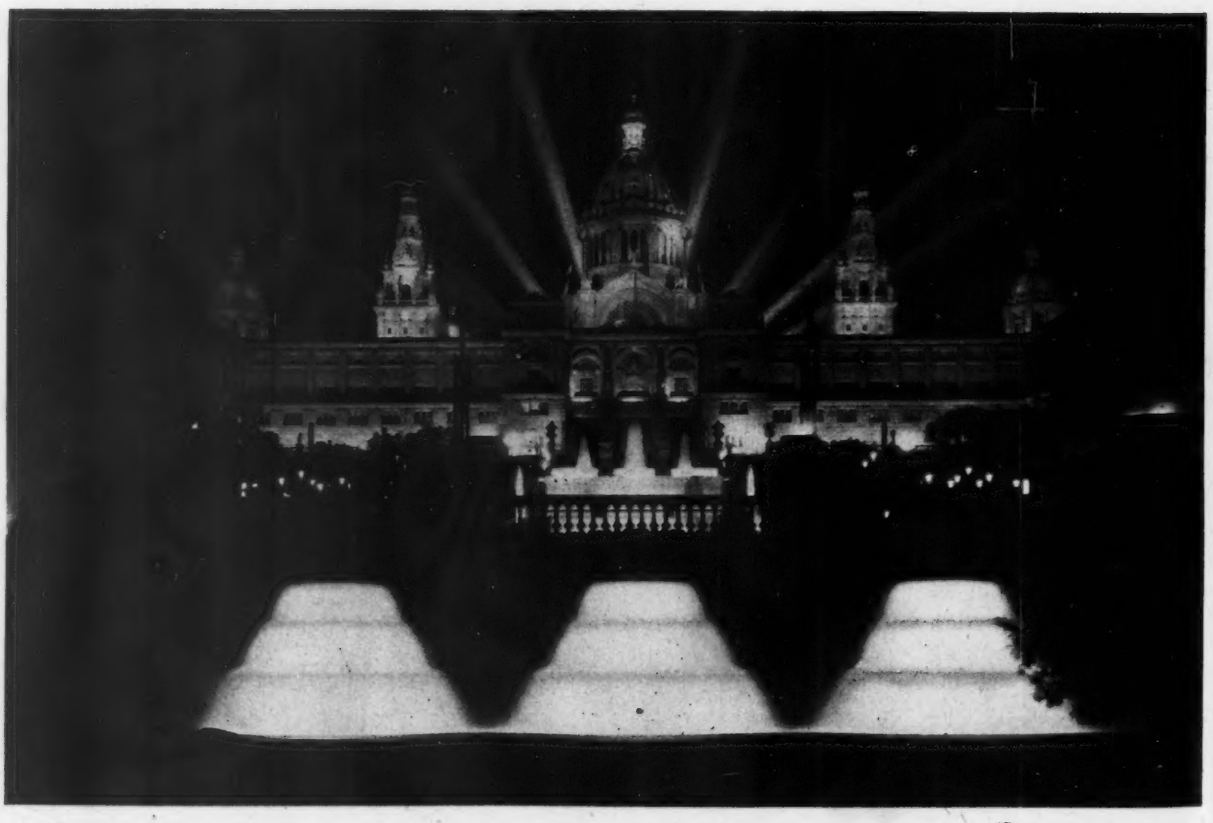
In the preliminary studies leading to these extraordinary effects, it was recognized that no commonplace display could greatly impress the enlightened public of this day. It is becoming increasingly more difficult to create a thrill. Beautiful effects are seen in theatres, the movies, in electric advertising signs, at pageants, expositions, etc., until we seem surfeited almost to the deadening of our sensibilities. To this indifferent public it is necessary to present a phenomenon to break the hard shell of indifference. To do this the following fundamental qualities must be emphasized:

1. Harmony in proportions and colors.
2. Colossalism.
3. Mystery.
4. Novelty.

Particular care has been exercised in the first quality. A liberal budget and eight years in building made possible a full measure of the second quality but the third and fourth offered serious difficulties. Due to the topography of the grounds, it was very difficult to hide light sources completely. From the National Palace one looks down on the Great Fountain in Figure 1, so there is a tendency to exposed light sources from this viewpoint. The same is more or less true of many of the other light sources. This condition made necessary many preliminary tests which were made in an improvised laboratory in the cellars of the Palace of Alfonso XIII and afterwards confirmed by trials on a small scale at the points of actual emplacement.

Continuing the imaginary stroll, numerous glass columns are seen in the space fronting the National Palace. From this level there are two wide stone stairways with substantial stone balustrades on the pillars of which are approximately sixty large urns filled to overflowing with fruits and flowers of glass in their natural colors made luminous from light within the urns. The soft

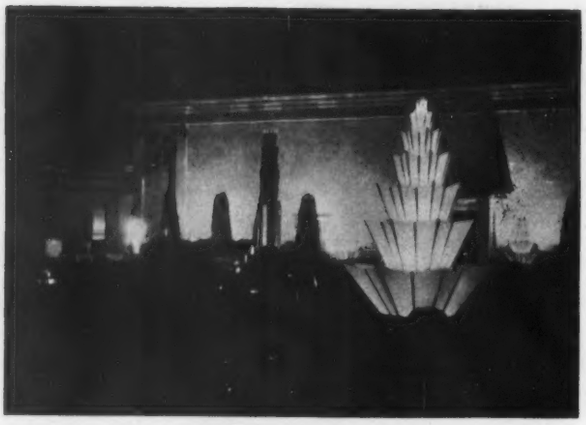
CASCADE NUMBER ONE AT NIGHT



CASCADE NUMBER TWO AT NIGHT

CASCADE NUMBER THREE AT NIGHT

CASCADE NUMBER FOUR AT NIGHT



ILLUMINATED CRYSTAL ELEMENT

random light from these adequately illuminates the stairs. Between the stairs a river of water appears and breaks forming Cascade No. 4, then disappears for a space of 40 meters and breaks forth again in Cascade No. 3. In the intervening space are four very large columns of paneled glass made luminous. There are, also, through the esplanades to both sides various other large ornaments. Some are in the shape of artichokes, others suggest stalagmites, but most of them consist of flat glass panels in modernistic mode.

Cascade No. 3, of beautiful contours, falls to the level *c*, Figure 1. The lighting of this cascade differs from that of Cascade No. 4, the former having separate units for each color while the latter has one set of clear units with color screens which are driven by motors remotely controlled in synchronism with the color progression. The position of each color screen is indicated at the central control station.

At the foot of Cascade No. 3 is a terraced space in two levels. On the upper level are found two large paneled glass ornaments shaped like pineapples. These are illuminated from projectors within, directed upwards. Seven circular bands of color may be had or the entire ornament may be one color at the will of the operators. There are also in this space four clusters of glass spikes, Figure 9, suggesting giant castuses in modernistic fashion. The last six ornaments described require a total of 40 kw. capacity in reactors. The façades to both sides of this plaza are softly illuminated in either white, red or blue. The lower level of this plaza is in a similar manner beautifully ornamented.

Between Cascades 1 and 2, the space *f-f* in Figure 1, is the Plaza de Bellas Artes. Here are six large columns and a great variety of ornamental forms fabricated of paneled glass aggregating a total connected load of 700 kw.

In the center of this space is the Great Fountain which is especially noteworthy because of its size, the volume of water and light employed and its great flexibility both as to hydraulic and lighting effects. Its basin measures 64 by 48 meters. The flow of water is 2600 liters per second (42,000 gals. per minute) actuated by five pumps driven by 1100 hp. of motors. The center jet having a 13-centimeter (5-inch) orifice spurts a shaft of water more than 30 meters into the air which is illuminated by a battery of twenty-four incandescent searchlights aggregating a load of 36 kw. About this, in three concentric rings, are many other jets which spurt to successive levels and in various directions so that this fountain presents an almost endless change in form and color. The basin of this fountain is in reality the roof of a complete electric plant, with its turbines, pumps, valves, governors, motors, switches, lighting units, etc. The surface of the basin is formed of glass plates through which the light from more than 1000 lamps is projected from waterproof units.

After passing Cascade No. 1 one enters upon the Avenida de Americas skirted with floodlighted façades and having a row of glass columns on either side. Back of each row of glass columns is a row of small fountains; all these are links in the mobile color chain.

Where façades are illuminated in order to give the impression of interior life, the windows, doors and porticos are illuminated from the back, all in soft tones harmonizing with the lighting of the façades.

Stone incense pots showing colored vapors are also employed at certain locations but in moderation. In general, green and light blue colors for static effects of considerable duration are preferred to deep reds; orange and gold, however, are not lacking. All elements are softly illuminated with diffused light, avoiding disagreeable glare. The qualities of comfort, mystery, elusiveness, and colossalism are outstanding.

When a sheet of water falls unbroken, the light sources back of it may be seen as through glass. In the cascades there are several falls more than 10 feet in height and since a great volume of water is utilized, it is not immediately broken in its fall. The light sources in general are well up under the ledge from which the water falls so it was necessary to provide for mist, and this was accomplished by placing back of the falls a transverse pipe having many small spray nozzles pointing upward, from which small streams impinge somewhat at random causing the space between the sheet of water and the stone structure to be filled with a fine mist. This greatly improves the luminous qualities, having an effect very similar to that of adding a slight diffusing pigment to clear glass.

FOUNTAINS AT NIGHT

The Sequence of the Color Cycle Performance

After the foregoing cursory description it is interesting to view the entire vista as seen from the end of the Avenida de Americas. From here the terrain slopes upward and, assuming for the moment that the floodlighting of the Palace is turned off, there descends from a considerable height out of a dark background the river of colored water in the form of cascades which, arriving at the third square (*ff* Fig. 1), opens into different branches, and due to the illuminated fountains at the side of the first and second squares supplemented by the different crystal elements in which the color change is co-ordinated, these two lines of water and light are continued throughout the sloping central area.

From top to bottom of this river of water and light different colors proceed in successive waves which gradually reach their crest and fade on the dimming cycle without sudden changes, showing different tones of color and giving the distinct impression that these waves flow downward the same as the water which carries them.

The top of this long band of light being open the aurora of soft color beams seems to spring from a point of common origin with the stream. Over the luminous background formed by the aurora is outlined very darkly a silhouette of the National Palace. This aspect, according to the standard program, will last 20 minutes.

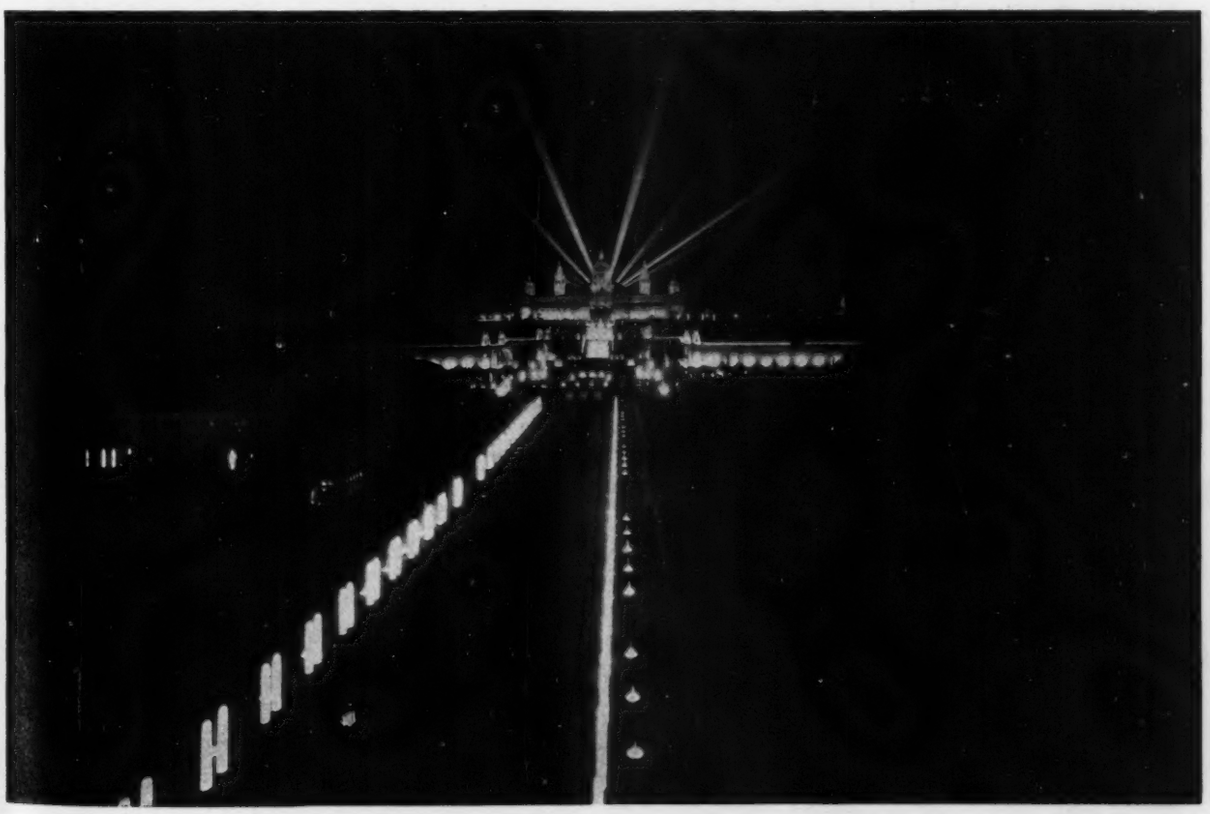
Then, while the lights of the cascades and fountains of Square No. 2 and the crystal pedestals of the Avenida de Americas become dark, there suddenly emerges in the center of this entire scene in relative darkness, the great fountain's central jet which, with its height and brightness, provides adequate illumination for the whole of Squares 1 and 2. The attention is then concentrated for some time on the most impressive spectacle of the greatest fountain the world has ever seen.

Following this there is a period during which the Great Fountain continually changes both in its hydraulic and lighting aspects, and then it gradually fades out, after which the façades of abutting palaces, and particularly of the National Palace, becomes strikingly illuminated with full white light outlining the buildings against the dark sky. Simultaneously the cascades, fountains, trees, stone urns, and crystal elements contribute to the outstanding aspect of the whole.

This great vision of magnificence and splendor, with an absence of change, is a striking contrast with the previous sights. Next, the cascades are animated again with lively changing and moving colors of ever-changing hues and enchanting mystery. Other elements introduce variation with lights pale and soft in slow progression continuing into a most fantastic and imposing vista from the center of which bursts the Great Fountain again with its constantly changing emotions.

The foregoing act extends over a period of twenty minutes. Now there is suddenly an abrupt change. The façades, cascades, trees, elements, fountains, and all become red.

After all the preceding rhythmic motion this unex-



GENERAL VIEW OF THE DECORATIVE AREA AT NIGHT

pected abrupt change is very impressionable. The entire central area including people and all objects are now illuminated red and above is the aurora all red, which at another time changes momentarily to other hues for contrast with the monochromatic field below.

After five minutes, the red illumination is changed for green throughout the entire zone. The effect is strange and weird, particularly as one observes the different appearance of people and objects as contrasted to their appearance under the red light.

After five minutes, Act I is repeated, and so on through the program again. However, the Great Fountain will continue to present different aspects to those exhibited in the first session, and it will also continue different to those exhibited in the successive sessions during three or four days because of the great number of combinations possible of the different movements of the water which permit six hours of operation, changing each two minutes, without repeating the same combination of movement. It is possible to visit the Exhibition repeatedly at night and discover in the decorative illumination and in the luminous fountain new and different aspects.

**By communicating with the Illuminating Engineering Society, 29 West 39th Street, New York, N. Y., a somewhat more detailed description of the apparatus employed may be found in a paper presented by Mr. Stahl before the twenty-third annual convention of this society at Philadelphia, Pennsylvania, September 24-27, 1929.*

COLUMBIA-PRINCETON-YALE COMPETITION

THE SUBJECT OF the program for the Columbia-Princeton-Yale Competition in Advanced Design was *An Athletic Club*. The *esquisse* was issued 9 a. m., Monday, November 4, 1929; due 6 p. m., Tuesday, November 5, 1929; Rendu—12 p. m., Saturday, December 7, 1929; Judgment—December 13, 1929, at Princeton University.

The program was as follows:

An Athletic Club

The site of this club is on the edge of a city, similar to Hartford, Connecticut. On the North side of a wide straight boulevard is the club property and on the South side an extensive public park.

The membership of the club is limited to two thousand (2000) and for this number there must be provided the accommodations and facilities usual in such a club. These may be divided into three general groups, as follows: A—the social needs; B—the athletic activities; C—the residential accommodations.

These various parts are to be connected and related to each other so that the regular flow of club life will not be disturbed by the necessary noise of strenuous activities, nor should constraint be placed on the freedom of the latter by the presence of those who are engaged in quiet pursuits.

The problem is a modern one, conforming to the life of prosperous men of affairs. The building should be elegant and even sumptuous.

The principal requirements of the plan are given below. Stated areas are approximate only, and may be increased or decreased within reasonable limits.

REQUIREMENTS OF THE FIRST FLOOR PLAN: *Group A, the social needs:*

A vestibule and coatroom, 1000 sq. ft.

A reception hall, used as a general lounge, from which one reaches the office, and one or two strangers' rooms of 200 to 400 sq. ft. each—totaling 3000 to 4000 sq. ft.

A billiard room, 2000 to 3000 sq. ft.

A combined library, reading and writing room, 800 to 1200 sq. ft.

A bar and private locker room, 600 to 1000 sq. ft.

Three card rooms, totaling 1200 sq. ft.

A ladies' reception room, dressing room and toilet, and separate outside entrance, 500 to 700 sq. ft.

Elevators, stairs, service rooms, etc.

Group B, the athletic activities: A gymnasium, 4000 to 5000 sq. ft., with observation corridor or gallery.

Two offices for instructors; a storeroom for properties. Stairs, service rooms, etc.

Optional: Two or more rooms for minor athletic activities and instruction may be placed on the first floor. If not so placed, arrangements should be made for them on other floors.

REQUIREMENTS OF OTHER PARTS OF THE BUILDING: The residential accommodations, *Group C*, are to be on the upper floors. There will be 100 to 125 comfortable private bedrooms; each with closet and bath. The baths may have outside windows, or may be placed inside and ventilated by shafts. Stairways, elevators, storerooms, valet rooms, toilets, etc.

Other accommodations to be included, but not shown on the floor plans are:

A reception room, ballroom, restaurant, private dining room, and kitchen, with usual dependencies.

A swimming pool, locker rooms and special activity rooms.

A heating and lighting plant is not to be included. It is to be assumed as in a separate building, entirely outside of the ground area involved in this problem.

The building may be varied in outline to make part of it many stories, or it may have one main cornice line for the greater mass, or it may take any form between these two. There may be porches, loggias, arcades and terraces at suitable positions. Any style may be used. It is important that the interior functions of the building and the positions of the various units within the building be expressed on the exterior. This is especially true of the second story, since no plan of this floor is required.

The general study of the problem should include a treatment of the grounds around the building. The property slopes away to the North from the Boulevard, with a fall of 5′ to 7′ per hundred, and stretches away to the golf links on rolling ground.

REQUIRED: *For the preliminary sketch:* Plan of first story, front elevation and section; all at the scale of 1/32″ equals 1′. This is to be submitted on a sheet of tracing paper 11″ x 19″.

It is suggested that the student make a small scale study of the final sheet, before handing in his esquisse, in order to determine whether or not his building exceeds any of the natural limits of size established by the scales of the final drawings and the size of the final sheet.

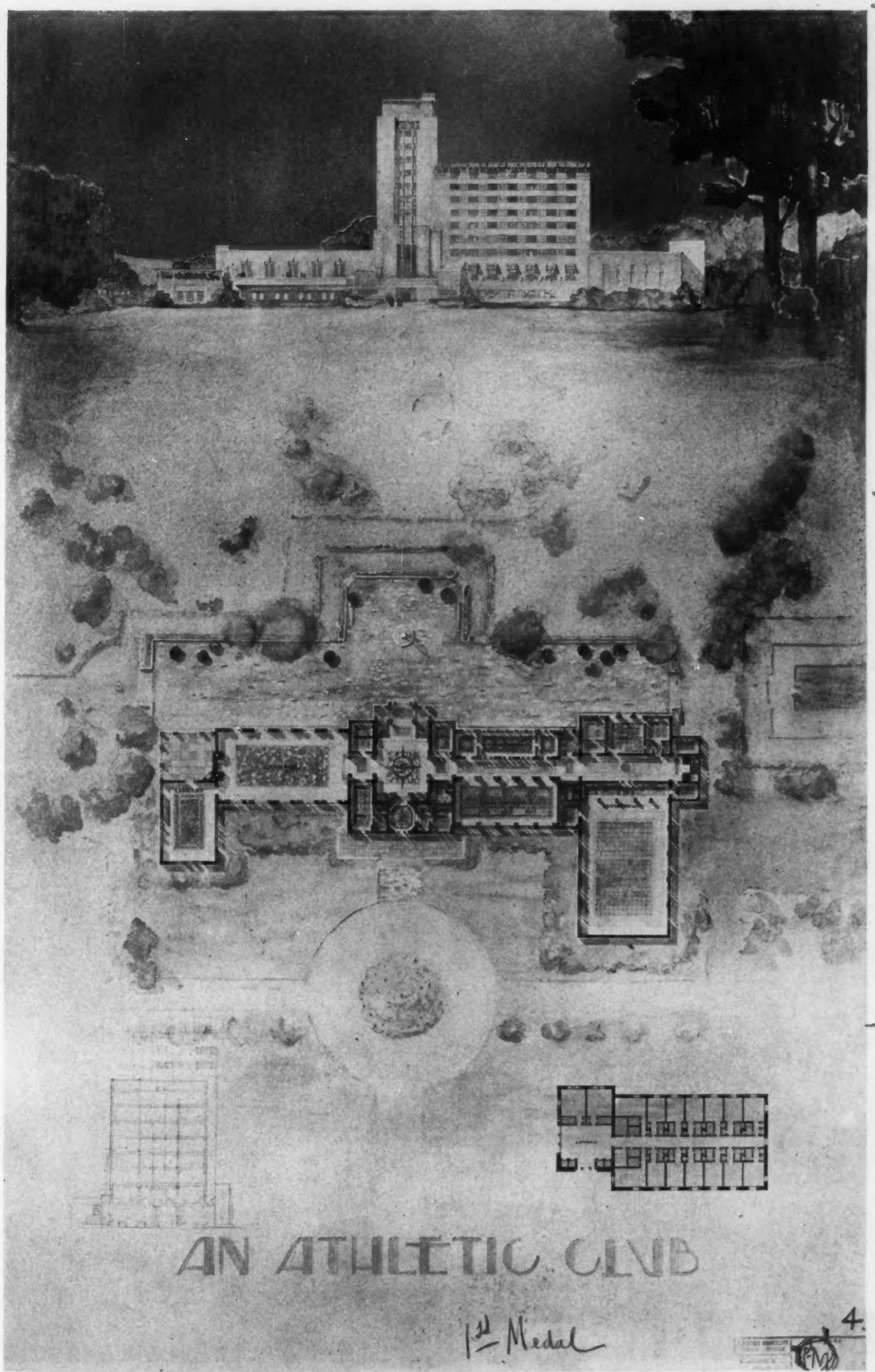
For the final drawings: Front elevation at the scale of 1/8″ equals 1′.

First floor plan at the scale of 1/16″ equals 1′.

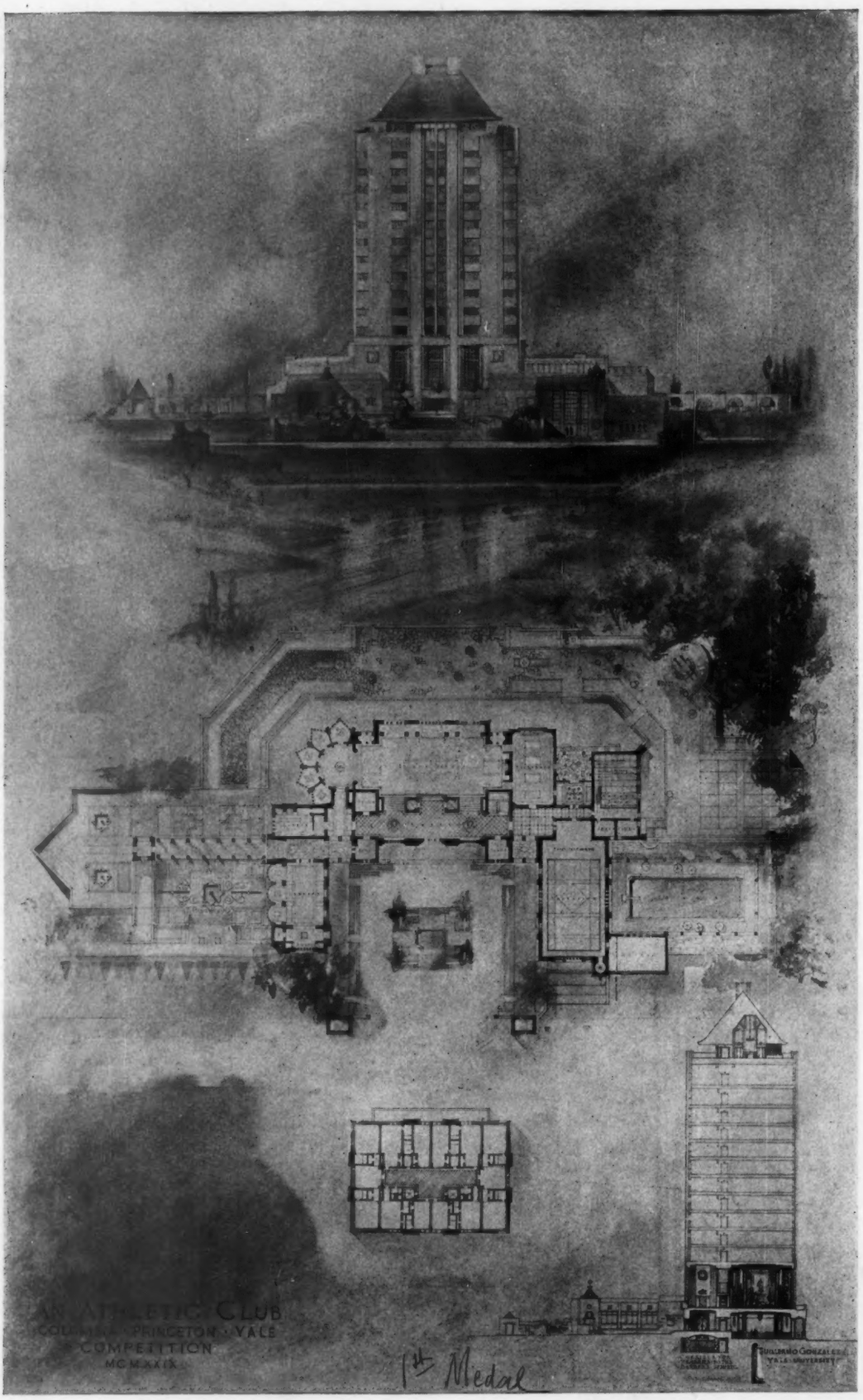
Typical bedroom floor plan at the scale of 1/16″ equals 1′.

Section, at right angles to the Boulevard, at the scale of 1/16″ equals 1′.

Each school submitted ten problems for judgment. The four first medal drawings are reproduced on the following pages.



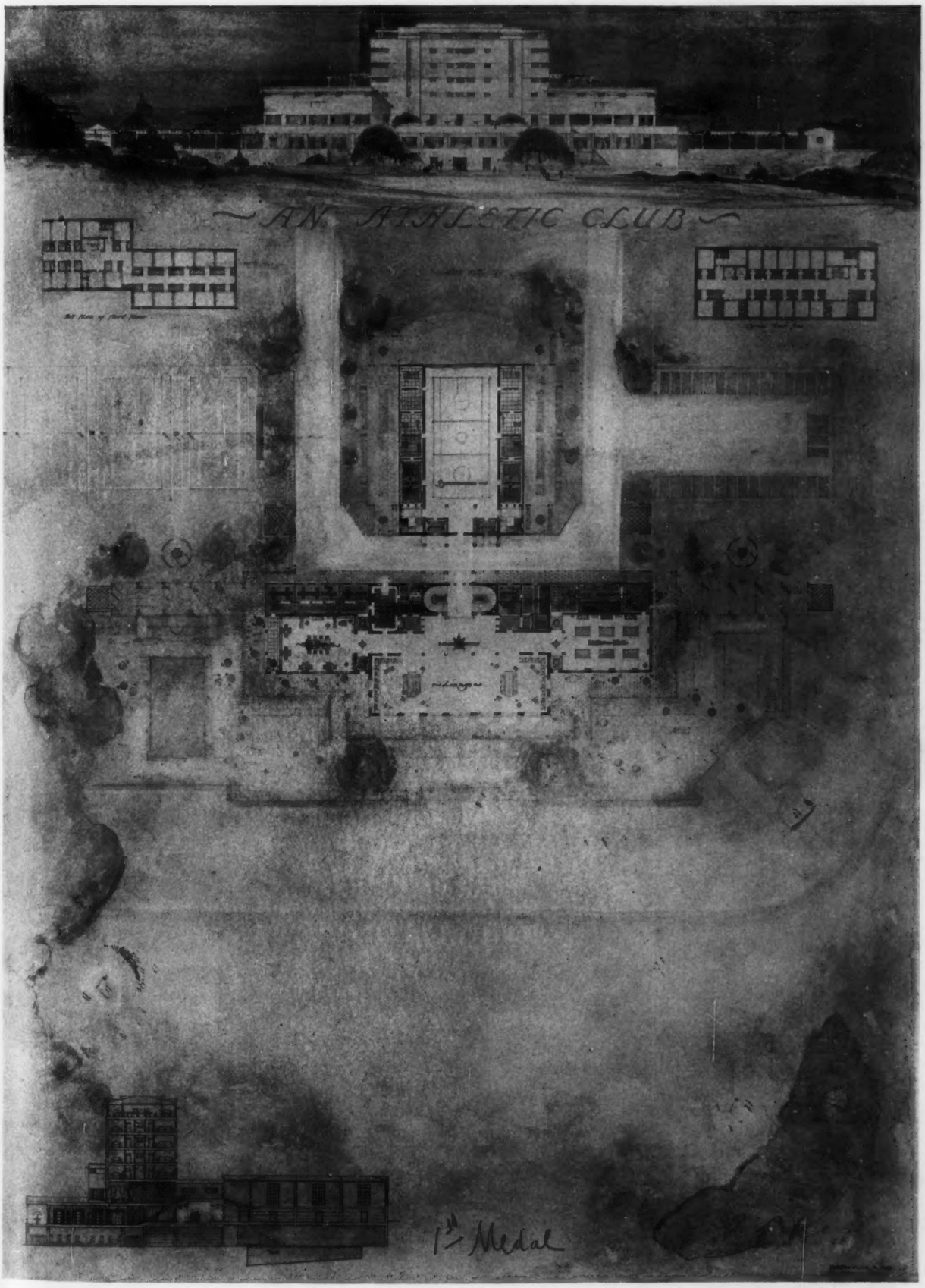
1ST MEDAL—DESIGN FOR AN ATHLETIC CLUB BY W. H. JACKSON, JR., COLUMBIA UNIVERSITY
COLUMBIA-PRINCETON-YALE COMPETITION IN ADVANCED DESIGN
(See text on page 138)



1ST MEDAL—DESIGN FOR AN ATHLETIC CLUB BY GUILLERMO GONZALEZ, YALE UNIVERSTIY

COLUMBIA-PRINCETON-YALE COMPETITION IN ADVANCED DESIGN

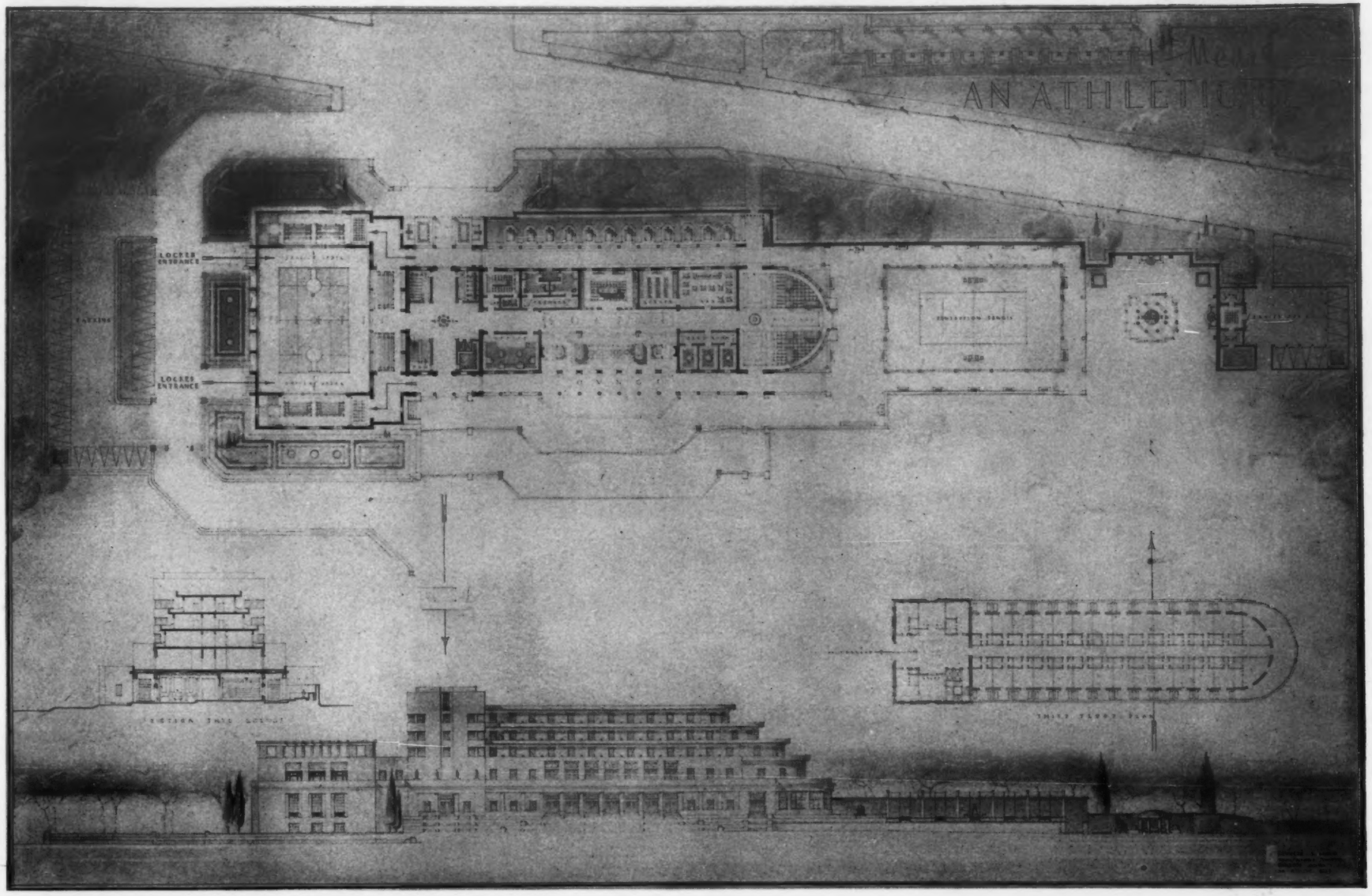
(See text on page 138)



1ST MEDAL—DESIGN FOR AN ATHLETIC CLUB BY H. S. GOODWIN, YALE UNIVERSITY

COLUMBIA-PRINCETON-YALE COMPETITION IN ADVANCED DESIGN

(See text on page 138)



1ST MEDAL—DESIGN FOR AN ATHLETIC CLUB BY KENNETH S. KASSLER, PRINCETON UNIVERSITY

COLUMBIA-PRINCETON-YALE COMPETITION IN ADVANCED DESIGN

(See text on page 138)

ALPHA RHO CHI CONVENTION

THE FIFTEENTH ANNUAL CONVENTION OF ALPHA RHO CHI, national social architectural fraternity, was held Dec. 30th and 31st, 1929, at the University of Illinois. In the late afternoon of Dec. 31st the entire convention journeyed to Chicago, where a formal dinner dance was held at the Architects' Club there. On New Year's Day an inspection trip of Chicago followed. The dinner dance and inspection trip were sponsored by the Chicago Alumni Chapter.

The Alpha Rho Chi Travelling Exhibit, sponsored by the New York Alumni Chapter, was displayed in the exhibition gallery of the Architectural League of New York City from Dec. 23rd to Jan. 4th. Included in this exhibit were several water color sketches by Mr. Cass Gilbert, who holds one of the highest honorary memberships in this fraternity.

SOUTHERN STATES ART LEAGUE

FROM THE HEADQUARTERS of the Southern States Art League in New Orleans, La., President Ellsworth Woodward issues a call to all active members of the League to prepare for the Tenth Annual Exhibition, to take place April 2-30 in the Isaac Delgado Museum of Art in New Orleans; and to both active and sustaining members to be represented in the Tenth Annual Convention, April 2, 3, and 4, 1930. He emphasized the policy already declared, that the League does not enter into competition with local organizations, but that it exists for the purpose of widening opportunity for artists of a degree of maturity beyond the amateur and student class. This annual exhibition should be an outstanding event, exhibiting only the best which the South can produce.

THIRD ANNUAL SMALL HOUSE COMPETITION

Prizes Awarded in The House Beautiful Competition

THIS YEAR THE first prizes were carried off by Eastern architects, although California again contributed nearly twice as many designs as any other one state.

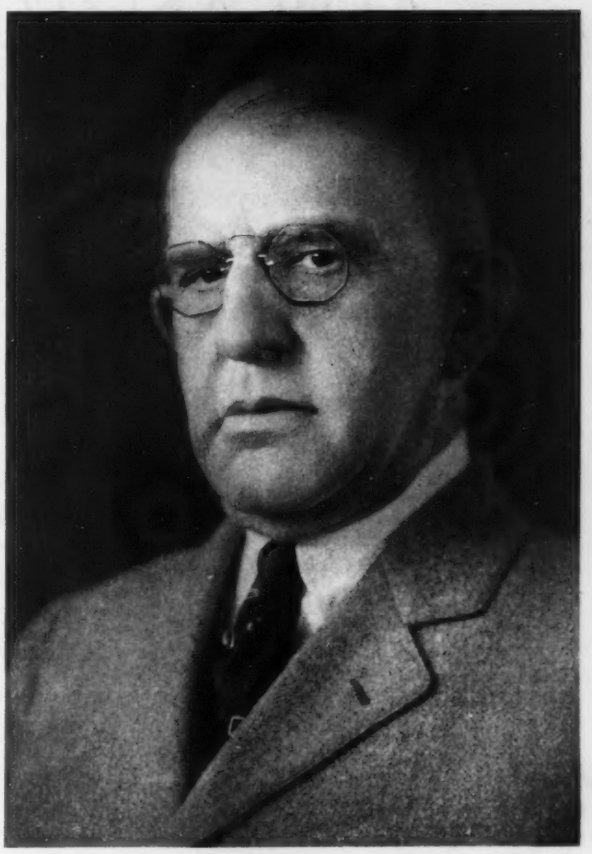
The judges included Roger H. Bullard, of New York, and Robert P. Bellows, President of the Boston Society of Architects, both of whom were selected from a number chosen by the Chairman of the Committee on Competitions of the American Institute of Architects. The third judge was Miss Ethel B. Power, Editor of *The House Beautiful*.

The jury unanimously awarded the two first prizes of $1,000 each to S. Arthur Love, Jr., of Philadelphia, Pa., for the best eight to twelve room house, and to R. J. Percival of Hartford, Conn., for best five to seven room house.

Houses submitted by the following architects received *High Commendation:* Marston and Maybury (2 houses), Pasadena; Wesley Sherwood Bessell, New York; Gordon B. Kaufmann, Los Angeles; Mrs. James Osborne Craig, Santa Barbara; Mary Elizabeth Winsor, Boston; Roger D. MacPherson and William McL. Dunbar, Rochester.

Houses entered by the following architects were accorded *Honorable Mention:* John Upton Clowdsley, Stockton, California; Soule, Murphy and Hastings, Santa Barbara; Wesley Sherwood Bessell, New York; Waldron Faulkner, New York; Gordon B. Kaufmann, Heth Wharton, H. Roy Kelley, D. J. Witmer, and L. F. Watson, all of Los Angeles; Kirtland Cutter, Long Beach, California; Miles B. Dechant, Reading, Pennsylvania; W. H. Emory, Jr., Baltimore.

In addition to these designs, twenty-nine others have been selected to form an exhibit which will be shown in the principal cities of the country.



LEO REMY HAMMOND

LEO REMY HAMMOND, secretary of The Connecticut Architectural League, Inc., died November 29, 1929. At a meeting of the League on December 23rd, the following resolutions on Mr. Hammond's death were adopted:

"To our Honor Roll of former departed associates, we record with profound sorrow the cherished name of Leo Remy Hammond who died on November 29, 1929.

"He was a master of his profession and gained a wide reputation as a writer of architectural subjects. He was elected secretary of the Architectural Club of New Haven in 1913 and assisted in the organization of the club. He was the leading factor during the past ten years in holding the annual architectural exhibition and published each year a comprehensive catalogue in connection with the exhibition.

"In 1928 he conceived the idea of extending the club's activities throughout the state of Connecticut and after a reorganization the name was changed to the Connecticut Architectural League, Inc.

"He endeared himself to all the members of the club and to the architects of the state by his unfailing loyalty to the club and to the architectural profession. Due to his efforts we feel that the architectural profession at large has been placed on a higher plane and feel especially grateful because of the fact that he gave the best years of his life to the uplifting of a profession of which he was not a member. We sincerely regret that he did not live long enough to see his greatest desire fulfilled, that of obtaining Registration for Architects in the state of Connecticut."—Walter R. Shiner, President, for the Board of Directors of The Connecticut Architectural League, Incorporated.

1ST MEDAL—DESIGN FOR AN ATHLETIC CLUB BY ... COLUMBIA-PRINCETON-YALE COMPETITION IN ADVANCED DESIGN (See text on page 138)

A PLAN TO INFORM LAYMEN
AND VALUE OF THE

FOR MANY YEARS PAST it has been evident to us, and to everyone connected with the profession of architecture, that a great many people who spend annually a large sum of money for buildings of various kinds do not understand the value to them of expert architectural services in connection with their building projects.

In order to make at least a beginning to correct this state of affairs we propose to take certain steps as follows: We are preparing a document which will be published by us with the title "The Value of the Architect's Services." This document will set forth clearly the advantages of employing an architect. We shall assume that the person for whom this brochure is being written knows nothing about an architect or what he can do for a client. We shall assume that the reader is definitely interested in a building of some kind and wants to get the greatest possible return for his money. We shall hope before the last page is reached to meet and answer every question pertaining to the services of an architect that can occur to the mind of any person intending to build.

The subject of architects' fees will be considered carefully with the purpose of making it plain that such fees constitute a wise expenditure of the investor's money and not merely an additional expense bringing no proper and adequate return. Unfortunately a great many people now feel that when they proceed without architectural services they are actually saving the sum represented by the architect's fee and are therefore that much ahead of the game.

There will be a discussion in considerable detail, with illustrations where necessary, of the functions of the architect. We believe that better public understanding of what the architect does and why he does it will help to make him more generally appreciated.

Believing that this document can be of immediate use we shall send a copy to every architect. Additional copies may be secured by any architect at actual cost, in such quantities as desired for distribution to potential clients and to others who would benefit by its study. In this way many copies will reach the hands of people intending to build and those whose influence will be important.

In periodicals of national circulation, reaching diverse groups of people likely to invest money in all classes of buildings—in the smaller centers as well as the large cities—we will buy advertising space in which we will suggest the advantages of employing an architect. Some of the important points in our document will be stressed and the offer will be made to send free copies to those who apply for them. In this way a large circulation among people immediately interested in building can be secured within a short space of time.

CONCERNING THE NATURE OF THE ARCHITECT'S SERVICES

Copies of the document will be mailed to the editors of newspapers covering all sections of the country with an explanatory letter to each suggesting that the topics covered might be of vital interest to their readers. We plan to furnish copies of our document in response to inquiries received as a result of this publicity.

This much we propose to do from our own funds and quite apart from any contribution from architects and others who may decide to participate in the movement.

Our tentative plan for raising a larger fund which would make possible an extension of the preliminary activities indicated above is as follows: Any architect may contribute $25.00 a year for the period of two years. Any draftsman may contribute $5.00 a year for the same period. Any manufacturer of building materials who desires to do so may join with the architects and draftsmen. No one will be urged to contribute unless he believes in the underlying idea and in the ability of the publishers of PENCIL POINTS to carry the campaign to a successful conclusion.

Should the architects, draftsmen, and manufacturers of the country place in our hands a fund of sufficient size, the program will be extended in various ways, depending upon the size of the fund and the situation as it is found to be after the preliminary steps have been taken. We are now in consultation with the Institute authorities, with many other groups of architects, and with publicity experts in order to formulate more definite plans for the later stages of the campaign. When final conclusions have been reached definite announcements will be made.

Do not make any contributions to this fund now. The box office is not yet open. Hundreds of pledges of financial support have already been received from individuals, Institute Chapters, and other groups, and it is probable that within thirty days definite arrangements for starting the fund will be announced.

We wish to make it perfectly plain that it is not our purpose to attempt to accomplish anything with the general public through the publication of material in PENCIL POINTS. PENCIL POINTS does *not* reach the people we want to reach and would therefore be of no service for the purpose in mind. The only way PENCIL POINTS will be employed at all will be to acquaint the profession with the progress of the campaign.

It is our belief that right now, while building is comparatively slack, is the time to inform people who are going to spend money for buildings concerning the great benefits they can derive from the employment of an architect. What we do now will have a great bearing on this whole matter during the rest of this year, next year, and in the years to come.

HERE & THERE AND THIS & THAT

CONDUCTED BY E·L·C

This department conducts four competitions each month. A prize of $10.00 is awarded in each class as follows: Class 1, sketches or drawings in any medium; Class 2, poetry; Class 3, cartoons; Class 4, miscellaneous items not coming under the above headings. Everyone is eligible to enter material in any of these four divisions. Good Wrinkle Section: a prize of $10.00 is awarded for any suggestions as to how work in the drafting room may be facilitated. No matter how simple the scheme, if you have found it of help in making your work easier, send it in. Competitions close the fifteenth of each month so that contributions for a forthcoming issue must be received by the twelfth of the month preceding the publication date in order to be eligible for that month's competition. Material received after the closing date is entered in the following month's competition.
The publishers reserve the right to publish any of the material, other than the prize winners, at any time, unless specifically requested not to do so by the contributor.

THIS MONTH'S HEADING is by Elliott L. Chisling of New York, the winner of the second prize in our recent competition. Very nice, isn't it?

Next thing on the program is the Christmas Card Competition. The judgment of this lasted over a period of ten days and our office looked more like a Christmas card shop than anything else we can think of. The Jury found it absolutely impossible to select any one card as *the winner* and finally, upon unanimous vote, two first prizes were selected: the design by Zay Smith, of San Antonio, shown on page 148, was selected by the Jury for its beauty; and that by Roger M. Rittase, of Philadelphia, shown opposite, for its originality. These gentlemen will each receive a ten dollar prize.

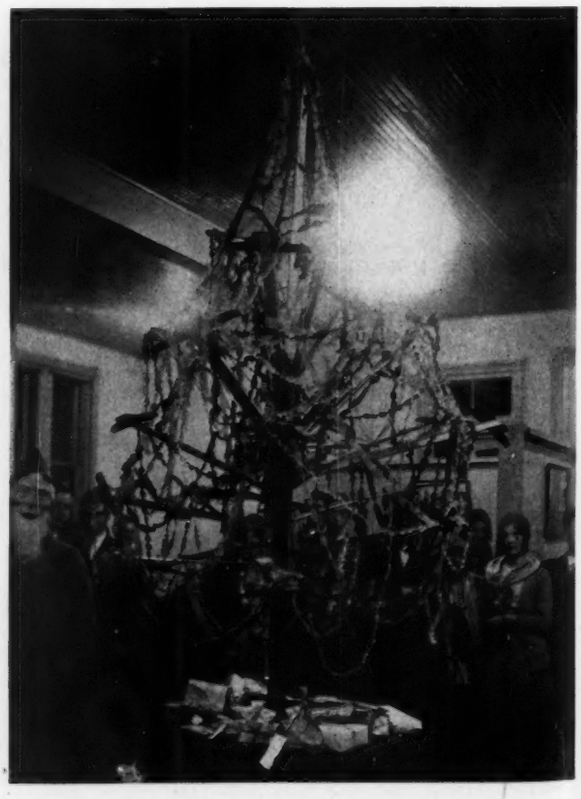
The cards submitted by Gordon Lorimer of New York, Herbert S. Rosenberg of New York, and A. Broun of New York, all received honorable mentions and a prize of five dollars each. We want to thank our many readers who submitted cards in this competition and to express our appreciation for the many personal cards sent to E. L. C. by contributors to Here and There.

The prizes in the regular monthly competitions are:
Class I—George Nelson, of New Haven, Conn.
Class II—Richard Wright, of Los Angeles.
Class III—No award.
Class IV—W. F. Schaphorst, of Newark, N. J.

At the last minute the editors took one of our pages away from us for "more important material." We fail to understand this, but that's how it goes! As a result we're very crowded for space and cannot present the second drawing in our Highlights of Architecture series. However, we've put in a reservation for an extra page in March and there'll be trouble if we don't get it.

What about our old friends the cartoonists? We haven't seen anything at all this month, and the poets are not working too hard either. Let's hear from you!

CONTÉ CRAYON DRAWING BY GEORGE NELSON
(PRIZE—*Class One—January Competition*)



CHRISTMAS TREE MADE OF T-SQUARES BY SOPHOMORES AT THE UNIVERSITY OF TEXAS

leading men everywhere now enthusiastically endorse

MERRY CHRISTMAS and HAPPY NEW YEAR

Mr Rittase, club man and art critic, is also known as the best endorser for his weight in the country. Among other things he has given the cachet of approval to aluminum shoe strings, non-refillable collar buttons and bathtub tooth picks

ASSURED social position . . . the heritage of a famous name . . . the advantages that unlimited wealth bestows—all these since birth have belonged to Mr Rittase. And what advantages they are! To mingle with the world's leading nitwits, to be one of the international smart set that foregathers at Cannes, at St. Moritz, at Palm Beach—wherever life is lived most completely, most sybaritically is indeed to be envied. But even in this charmed circle happiness is not always complete. As Mr Rittase so graciously put it, "For years I realized there was a certain lack in my life, but did not think it arose from my failure to celebrate properly the holiday season. I had heard in a roundabout way that the bourgeoisie were in the habit of making a certain vulgar display about it all, but did not think it was a celebration for the elite. I frankly acknowledge my mistake and give it my unqualified endorsement. May each and every one of my dear readers have a very, very, very Merry Christmas and a New year that is just as fine."

—Society for Promoting Christmas Cheer

AN UNUSUALLY CLEVER GREETING SENT OUT IN THE FORM OF A PRINTER'S PROOF BY ROGER RITTASE

THE BUSY ARCHITECT'S DAY (AND NIGHT)

By Richard Wright, of Los Angeles, Calif.

(PRIZE—*Class Two—January Competition*)

The postman brings the morning's mail,
A mass that swamps the decks,
An overwhelming avalanche
Of everything but checks.

And presently our callers come,
Solicitors and peddlers
And contumacious canvassers
And other intermeddlers;

High pressure agents clamoring
En masse from every side,
With raps and substitutions for
The things we've specified.

And artisans from foreign climes
Who model things in clay
Descend upon our necks and while
Our precious hours away;

And traffickers in rare antiques
Steal in upon our lairs
And seem to think our business is
To help them sell their wares.

A surging host, a milling throng,
Of salesmen bold and brash
And mendicants, and everything
But customers with cash.

The rush at last subsides: we've failed
We find out to our sorrow
To finish up those details that
Were promised for the morrow!

The sun descends, the shadows fall,
The night lights pierce the murk;
The day has gone to naught and so
Tonight we'll do our work!

HE HAS HIS TROUBLES TOO

(PRIZE—*Class Four—January Competition*)

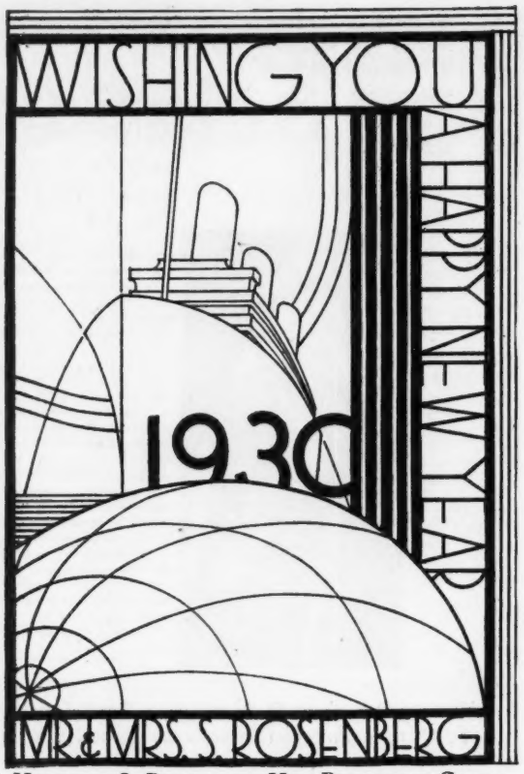
HERE IS AN interesting portion of a letter received by W. F. Schaphorst, M. E., of Newark, N. J., from a young man who is trying hard to make his way in the world. He aspires to be a technical writer and wrote to Mr. Schaphorst for advice because he had seen his name in print in a number of the engineering journals:

"I have written a good many short mechanical articles for a number of publications, but I am technically ignorant, and most of my work has been the mere writing up of handy devices for the "Wrinkle" pages of these magazines, and most of my ideas have come to my mind by seeing them in practice and making a photograph of the device itself to accompany my article, or a rough pen and ink drawing. I make all of my drawings free-hand. (The following, I think, is particularly good. W. F. S.)

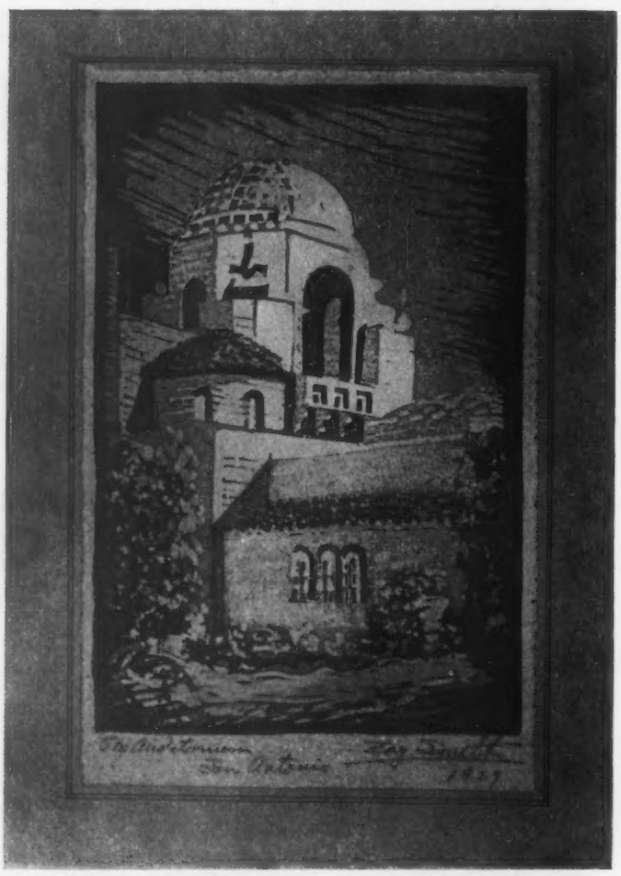
"I recently bought a drawing outfit of tools, and I don't see how on earth a man can make anything with that stuff. Maybe it is because I don't understand how to use them. There is a tool for making straight lines that has a point that resembles a bird's bill, two points formed by a curve of the two members that come together at the extreme end of the tool. I was told it was for making ink lines. When I dipped that thing in ink and tried to make a line it would either make no line at all or would smear the ink in a conglomerate mass across the sheet. That's all I could ever do with it. Wonder what is the matter?"

FROM A SKETCH BY EVERETT SMITH COFRAN
Student at Massachusetts Institute of Technology

HERE WE HAVE A MODERN VERSION OF THE FAMILIAR WISE MEN—BY GORDON LORIMER



HERBERT S. ROSENBERG HAD PHOTOSTAT COPIES MADE OF THIS LINE DRAWING



A linoleum block printed in dark brown on a light brown paper. The highlights of the tower are touched up with Chinese White and the dark portions of the print are stippled with gold water color.

MADE BY ZAY SMITH

A linoleum block printed in bright blue on white paper. The leaves are vivid green; the pipes and hair of the figure are gold. The print is mounted on an orange paper.

FROM A. BROUN OF NEW YORK

HERE ARE THE WINNING DESIGNS IN OUR CHRISTMAS CARD COMPETITION

THE SPECIFICATION DESK

A Department for the Specification Writer

THE GROWTH OF THE SPECIFICATION

By David B. Emerson

JUST WHERE AND WHEN the written specification had its origin is unknown, so far as I have any knowledge. Probably the earliest document of that nature which I remember seeing was the copy of the specification for the jail at Madison County, Mississippi, designed by John Lawrence, State Architect, dated December 29, 1834, which was published in PENCIL POINTS, for January, 1927. This particular specification was more in the nature of a descriptive text than a specification, and so brief that it might easily have been written on a single page of foolscap paper. There is every reason to believe that no written form of instructions which could really be classed as a specification was in use by the architects of the early Eighteenth Century, or before that time, as the architect of that period still continued to function more or less as the master builder, after medieval custom. In more modern times the specification grew up out of the changing business conditions and the wider separation of the duties of the architect and the duties of the builder—they were not called "contractors" in the early days. The early specifications were undoubtedly very brief, and not very specific, as business methods were rather lax in the building trades in the middle of the Nineteenth Century. I very well remember an old Boston builder telling me that when he was a young man working at his trade (between 1850 and 1855) the builders never had a regular pay day, but if a mechanic wanted any money, he asked "the boss," and he got five, ten, or if he needed as much, twenty dollars. Each man kept an account book in which he recorded the days he worked and the money he received, and the boss kept one also. At the end of the year, each man went over the record of the entire year with the boss and had a final settlement.

Now it certainly stands to reason, that if the relations between employers and employees were like that, the relations between the architect and the builder, and the builder and the owner, were liable to be rather flexible, or at least one might believe so. Under such conditions verbal instructions were probably more in vogue than written specifications. It has been frequently stated in the past, that the first really specific specification ever written in this country was written by John Stearns, of Peabody and Stearns of Boston, sometime in the '70s, and as no one has ever disputed it, it must be so. My own memories go pretty far back into the past, but not to those early days; they are history to me. When I first started as a student in an architect's office, specifications were always written by "the boss," as the professional specification writer was yet to make his appearance, and no architect was so visionary as to think that a draftsman could be trusted to do that part of the work; the majority could not, "the boss was right."

I have been told by one of the older men in the profession, that Carl Pfeiffer, one of New York's famous old architects of half a century or more ago, used to write the specifications for a good sized building over the week-end. Quite a number of the older architects in Boston were still writing their specifications longhand in those days, as only the largest and most progressive offices kept a stenographer and had their specifications typewritten. Most of those old-time specifications, in addition to being written in longhand, had free-hand sketches in the margins illustrating the various methods of construction which were described. If for any reason an extra copy or two of the specifications was wanted, a young draftsman or student was put to work making the copies longhand. I well remember having done it myself when I was a student in an office. Specifications did not mean so much in those days; the buildings were very much simpler; and big business had not as yet gotten into architecture.

The tallest building in the City of Boston in my early days in an architect's office was only seven stories high, and "fireproof": that is the floors had iron beams (not steel, but wrought iron) with brick arches and wooden floors. It was a wall bearing job, and the interior columns were cast iron and unprotected.

Building has changed since those days and it is hardly necessary to say the specification has changed with it. The advent of the high building, followed with the disastrous results of the fire in the building adjoining the Home Life Insurance Company Building in New York City in 1899, and the Baltimore fire in 1904, which showed up the vulnerable points in that form of construction, hastened the bringing out of several new materials which have added three new divisions to the specification, namely "metal windows," "metal covered work," and "hollow metal work," all of which have been perfected in the past thirty years.

Now that we have considered the beginnings of the specification and have placed the period of expansion at about 1888, we will take up its growth from that time until the present. Perhaps the best way to follow that growth is through various trades and divisions of the specification as it now stands. The first division, *General Conditions*, although it is a standard item has gone through some changes and has grown.

In the old specifications they were quite brief. I remember very well that about thirty-five years ago one of the largest offices in New York was content with one page foolscap size printed in small type. Until about 1915 *General Conditions* were a hodgepodge; some were good, some were bad and some were just mediocre, but at that time the American Institute of Architects brought out their standard form, which consists of forty-four articles, and is used by the majority of the architects in this country at the present time. It is a splendid working document,

but needs revising and enlarging to bring it up to date, as I have found that it is necessary to add from eight to ten supplementary conditions which are not contained in the standard form. One of the leading architect's offices in New York City has a set of *General Conditions* which consists of fifty-four articles filling eighteen typewritten pages.

Quite naturally, excavation is not very different today from what it was forty years ago, so far as the specification is concerned, although the methods used by the contractors have improved greatly. The steam shovel and the gasoline shovel (the last word in excavating machinery), and the pneumatic drills speed up the work wonderfully and help to offset the high wages of the laborers. Starting at the very lowest level in the building, the first item, if soil conditions are bad, is piles. Until recent years wood piles were universally used and had been for centuries. Vitruvius discusses them, the Venetians used them extensively, and I heard it said when I was a boy "half the City of Boston is built on piles." The first concrete piles were driven in 1901, and today we have the choice of the "cast in place," "pre-cast," "composite" (a wood pile with a "cast in place" or a pre-cast concrete pile follower) and the pipe pile, which is a steel pipe, driven to rock and then filled with concrete.

Foundations have been subject to quite a number of changes in the past forty-odd years. In those early days concrete played a very small part in building, the cement which was generally used and most commonly known was Rosendale cement which is no longer manufactured; all Portland cement was imported and commanded a high price. Machine mixers were unknown, so that all concrete was mixed by hand, and the old-time specifications called for it "to be turned over twice." Under those conditions it was never used except in exceptional conditions, such as the encountering of quicksand in an excavation. Reinforced concrete was in its formative state, and absolutely unknown in this country, except by reports of experiments which were being made in Europe by Considere and others.

Footings on the better class of work were formed of large blocks of granite, roughly squared and frequently stepped with one or two courses of granite blocks of smaller sizes. The wood piles of which I made mention were capped with granite blocks resting on the tops of the piles and depending mostly on their weight to keep them in place. Foundation walls were generally built up of rubble stone, except in high class work where bricks were used. Today our specification calls for concrete footings, very frequently reinforced, concrete foundations, with the concrete mixed by machine, using Portland cement with definite standards for cement and for coarse and fine aggregates which were not even dreamed of a few years ago, and even the water content of the mixture is regulated.

Back in the late '80s, waterproofing was not much used and none too well understood. The only system which was known at that time being the "membrane" waterproofing which is still with us and bids fair to stay for some time. In addition to the "membrane" system, we now have the "integral" method, the "waterproofed cement" (commonly called "Hydrolithic" waterproofing, as the first of the kind was Winslow's Hydrolithic Waterproofing, which came out about thirty years ago), and the iron oxide forms of waterproofing, all of which enter into the specification either as the basic bid or as alternative estimates.

Dampproofing is a comparatively new development in building, dating back not much more than thirty years, and in the past few years a large number of asphaltic mastics and elaterite dampproofings have been put on the market, and the specification writer must be familiar with as many of these as is possible. The most recent development in the waterproofing group, and the direct outcome of modern construction, is "spandrel waterproofing," something that was not required in the specifications of former days, as they did not have any spandrel beams; but it has come to be recognized as an absolute necessity today in our present type of steel frame construction.

Even brickwork has had a few additions in my time. The sand lime brick has come into the field, but so far it does not seem to have displaced the burnt clay product to any appreciable extent, but it is generally specified as an alternative.

In the face brick industry the additions are legion. In my youth about the only choice in face brick was the Philadelphia pressed brick, and the so-called Perth Amboy brick, which was a dark buff brick, first used about 1884, in Boston, by McKim, Mead, and White on the John F. Andrew house. Today we have colors and textures galore and new ones are coming out regularly.

In the early days of fireproof construction there was no great worry about floor arches, as in those days two ring brick rowlock arches were sprung between the beams, the skewbacks being generally cut from brick on the job and occasionally they were specially moulded. The beams were never fireproofed; one can go into any of these buildings and see the exposed lower flanges and the arches plastered between the beams. Now we have the reinforced cinder concrete flat slab, the reinforced stone concrete flat slab for long spans, the one-way reinforced concrete joist with hollow terra cotta blocks or hollow gypsum block fillers, the two-way reinforced concrete joist and hollow terra cotta block fillers, the poured-in-place reinforced gypsum flat slab, the pre-cast reinforced gypsum slab, and some other lesser known systems of floor construction, all of which the specification writer should know fairly well. In addition to various floor systems mentioned, there are several different types of mesh reinforcement which may be used in flat concrete slab construction: woven, electrically welded, expanded metal, ribbed lath, and others. Another comparatively new development in fireproof materials is the gypsum block for partitions, furring, and similar purposes, which helps to swell the volume of the specification. In fact the growth of the gypsum industry in the past forty years has added quite a number of new materials to the building trades, notable among which are the so-called "patent plasters," a gypsum product—and the plaster wall boards, of which there are a number of types on the market at the present time.

The widespread practice of plastering directly on the under side of concrete floor slabs and on concrete walls, with the frequent failures in bond, has brought out a new line of materials in the form of "plaster bonds" of a bituminous nature, and "bond plasters," another gypsum product.

With the rapid increase in the use of cement floors, due to modern fire resistive construction, it was found that cement floors abraded easily and dusted badly and also that they disintegrated under certain conditions. The result of these troubles was the introduction of a number of types of floor hardeners, both integral and surface applications, all of which at one time or another enter into the specifications. Also, as a direct result of the increasing use of cement finished floors, special paints and enamels for cement floors have been developed, as lead and oil paint was found to be unfit for that purpose.

In addition to the many changes and improvements in old materials and methods, and the ever widening of the scope of these materials and methods, certain absolutely new and original developments have come out in building construction which had no counterparts in former times. One of the most notable of these new developments is acoustical treatments. Until comparatively few years ago, acoustics were something more or less mystifying. Of course the architects knew that certain conditions produced good acoustical results, and others did not, but it was more or less of a "rule of thumbs" proposition, but the work of Prof. Sabine reduced it to an exact science. As a direct result of the work of Prof. Sabine and others, a number of different acoustical treatments are being used, several sound absorbing wall plasters, an acoustical tile, and several ceiling treatments which are applied to the finished plaster. Now that we have acoustical plasters, another new material follows in its wake; that is an acoustical paint which does not destroy the sound absorbing quality of the plaster.

Probably no one of the various groups of materials entering into building construction has been subject to a greater amount of expansion than have metals. Not so many years ago practically all the metals and alloys which entered into the construction of a building were cast and wrought iron, copper, lead, brass, bronze, roofing tin, and galvanized iron. At the present time we use Monel metal—which for quite a little time was a rolled metal but can now be cast and extruded like bronze: aluminum—which is now being used quite successfully for ornamental purposes, and rolled sections for casement sash have been successfully made and used: and hard lead, an alloy which will not creep and twist like sheet lead, and the abrasive metals which are extensively used for safety stair treads, door saddles, and other similar uses. The latest and most remarkable development in metals is a non-corrosive steel which offers great possibilities, if it does what is expected of it, and it looks very much as if it would.

For plating purposes in addition to nickel and electro bronze plate, we now have chromium and cadmium plates, the former used principally on brass and the latter on iron. The gradual elimination of wood in the construction of tall buildings has brought about the development of a number of different types of flooring which can be applied directly to the surface of the cement finish. The first of these flooring materials was to the best of my knowledge the rubber tile, followed by the cork tile, and the magnesite plastic floorings, and later the elaterite compositions and asphalt and asbestos compositions, which are among the latest additions to the long list of floorings which we now have to choose from.

While the other portions of the building have been going through the various stages of change and improvement, the door has had its share of attention. It is quite safe to say that up to about forty or fifty years ago, doors were very little different from what they were ten centuries ago, except for the sliding door which came out sometime in the first half of the Nineteenth Century. About thirty-five years ago the revolving door was put on the market; then came the accordion door and the sliding and folding door for interior use; and with the advent of the garage came the right angle door and other types of doors to turn corners and take up very little room. Finally we have the overhead door which takes up no floor space at all. Practically the entire evolution of the modern elevator door, with its track, hangers, opening and closing devices, and interlocking systems has been the work of the past thirty-five years.

Glass has also gone through a number of changes, along with the other materials. I can remember when practically all of our plate glass was imported from France, and I remember very well the old specifications which called for "double thick German glass" for ordinary glazing. Two new items in the glass market are "wire glass," which came into prominence a little less than thirty years ago, and "ultra violet ray glass," which was first introduced into this country from England some seven or eight years ago, and is now being extensively used in hospitals, solaria, and for living rooms in residences and apartments. There have been a number of new types of obscured glass put on the market in the past twenty-five years, all of which gives a wider selection for the architect.

During the past forty years the addition of new materials for painting and wood finishing have been something to marvel at. At that time white lead and linseed oil, mixed with tinting colors, oil stains and varnishes left in the gloss or rubbed down, distemper colors and calcimine were practically about all the choice the architect had. Since that time, enamels, gloss, eggshell and flat, enamel undercoaters, dull varnishes, nitro-cellulose lacquers, lithophone wall paints, aniline stains, water, acid and alkali-proof spar varnishes, and a legion of technical paints for iron, steel, and concrete, are some of the different materials which have been brought out and are in common use at the present time.

In the growth of the specification, nothing perhaps has been more pronounced in its development than the hospital specification. The entire technique of hospital construction has been developed within the memory of men who are not yet old. Not so very many years ago a hospital was just a building, built just like any other building, and divided up into wards, private rooms, operating rooms, and utility rooms; some of them are left and are glowing examples of what a hospital should not be. Today we are specifying special hardware, flush doors, special plumbing, tiled walls and floors in operating rooms and utility rooms, sheet steel equipment and other improved construction. One of the most prominent features in a present-day hospital is the X-ray room, something to which our predecessors never had to give a thought. Roentgen did not make known the results of his discovery until about 1893, and it was not until the ray had been used for some time that its penetration through walls, floors, doors, and windows, with the attendant serious results to those in range, were discovered. As a result the lead lined walls, doors, door frames and window shutters were introduced, and now a new material, barium sulphate plaster, is being specified for walls and ceilings.

During these past forty years about which I have been writing, plumbing has been practically revolutionized, and about all that remains of what was in the plumbing of that day is cast iron soil pipe with caulked joints and wrought iron pipe with screw joints. Lead pipe which was extensively used for supply and waste piping has been entirely done away with, and is now only used for short and irregular branches in waste lines, and for closet bends. Plumbing fixtures have undergone a wonderful change. The boxed-in tin bathtub (it was really copper, but we always speak of it as "tin"), the boxed-in hopper closets have long since become matters of history. In a fairly brief way I have tried to tell something of the growth of the specification from the days when I was a student in an architect's office, up to the present time, and I believe that most readers will agree with me that it was a much simpler task to write a specification in 1889, than it is in 1929. In following up the progress of the building trades

(Concluded on page 82, Advertising Section)

SERVICE DEPARTMENTS

THE MART. In this department we will print, free of charge, notices from readers (dealers excepted) having for sale, or desiring to purchase books, drawing instruments and other property pertaining directly to the profession or business in which most of us are engaged. Such notices will be inserted in one issue only, but there is no limit to the number of different notices pertaining to different things which any subscriber may insert.

PERSONAL NOTICES. Announcements concerning the opening of new offices for the practice of architecture, changes in architectural firms, changes of address and items of personal interest will be printed under this heading free of charge.

QUERIES AND ANSWERS. In this department we shall undertake to answer to the best of our ability all questions from our subscribers concerning the problems of the drafting room, broadly considered. Questions of design, construction, or anything else which may arise in the daily work of an architect or a draftsman, are solicited. Where such questions are of broad interest, the answers will be published in the paper. Others will be answered promptly by letter.

FREE EMPLOYMENT SERVICE. In this department we shall continue to print, free of charge, notices from architects or others requiring designers, draftsmen, specification writers, or superintendents, as well as from those seeking similar positions. Such notices will also be posted on the job bulletin board at our main office, which is accessible to all.

SPECIAL NOTICE TO ARCHITECTS LOCATED OUTSIDE OF THE UNITED STATES: Should you be interested in any building material or equipment manufactured in America, we will gladly procure and send, without charge, any information you may desire concerning it.

Notices submitted for publication in these Service Departments must reach us before the fifth of each month if they are to be inserted in the next issue. Address all communications to 419 Fourth Avenue, New York, N. Y.

THE MART

M. A. Cawl, 117 Albion Place, Passaic, N. J., wishes to buy the February, March, and May, 1929, issues of PENCIL POINTS.

Fred Lange, 10 So. 18th Street, Philadelphia, Pa., has the following books for sale: *The Smaller Houses and Gardens of Versailles, Masterpieces of Spanish Architecture, Architecture Toscane, Details of the Architecture of Tuscany, French Gothic Architecture, Small House Designs, Community Arts Association of Santa Barbara, California, Terra Cotta of the Italian Renaissance, Romanesque Architecture of Western Europe, Northern Italian Details, Philip Hooker, The Treatment of Interiors, Encyclopaedia of Iron Works,* and *American Country Houses of Today, 1922.*

Guy E. Steller, 1818 Miramar Street, Los Angeles, California, has for sale the following copies of PENCIL POINTS: December, 1925; January, March, April, May, July, August, September, October, November, and December, 1928; January to October, 1929, inclusive. Price, 20¢ per copy for the lot, or 25¢ per copy if sold singly, purchaser to pay the shipping charges.

Herbert C. Millkey, 119 Huntington Place, Cincinnati, Ohio, wishes to purchase the January, February, and March, 1929, issues of PENCIL POINTS. He is willing to pay $1.00 per copy.

Clarence M. Kratzer, 339 N. 6th Street, Allentown, Pa., would like to have the December, 1928, issue of PENCIL POINTS.

The Architectural Department of the University of Virginia, Charlottesville, Va., will pay fifty cents a copy for the following B.A.I.D. Bulletins: February, 1925; February, March, June, July, August, and September, 1926; December, 1927. In exchange or for sale, the department has November, 1925; October, 1927; September, November, and December, 1928; January, 1929. Also White Pine Series, Vol. 10, Nos. 5 and 6; Vol. 11, No. 5.

Robert H. Orr, 724 So. Spring Street, Rooms 1300-09, Los Angeles, Calif., will pay a liberal price for the first six volumes of PENCIL POINTS, namely 1920, 1921, 1922, 1923, 1924, and 1925, complete.

L. Perth, General Delivery, Manhattan Beach, Calif., wishes to procure the January, February, March, May, and July, 1929, issues of PENCIL POINTS.

J. H. Ferber, 1317 Russell Blvd., St. Louis, Mo., has for sale all PENCIL POINTS complete for the years 1925, 1926, and 1927 in A-1 condition. Price, $6.00 F. O. B. for the lot.

John P. Turner, Jr., 757 Mulberry Street, Macon, Ga., desires to obtain the following copies of PENCIL POINTS: July and August, 1925; April, May, and July, 1926.

Kirchhoff & Rose, 1300 Empire Bldg., Milwaukee, Wisconsin, wishes to sell the following White Pine Series: Volume XI, No. 6; Volumes XII and XIII complete; Volume XIV, Nos. 1, 2, and 3; Volume XV, Nos. 1, 2, 3, and 4. Price 25¢ per copy.

Library of Architecture and Allied Arts, 453 S. Spring St., Los Angeles, Calif., has for sale a new copy of D'Espouy's *Fragments d'Architecture Antique*, Volume 2. Submit offer.

J. C. Dressel, 1019 Elm St., Birmingham, Ala., has for sale copies of PENCIL POINTS from February, 1921, to September, 1929, inclusive, except January, 1923. Unbound, in good condition. Price $35.00 the lot, F. O. B.

W. E. Needham, 156 East 46th Street, New York, N. Y., would like to purchase a copy of *The Architectural Review*, Boston, August, 1913, No. 8, Vol. II (Old Series Vol. XIX).

PERSONALS

JOSEPH H. ROBERTS has moved from 311-312 Marine Bank Bldg. to temporary quarters at 616 Pacific-Southwest Bldg., Long Beach, California.

(Continued on page 8[illegible] Advertising Section)

FREE EMPLOYMENT SERVICE ITEMS WILL BE FOUND ON PAGES 86, 90 AND 91 IN THE ADVERTISING SECTION

WATCH *Pencil Points* each month for the Eldorado Texture reproductions by Ernest W. Watson. Send for samples of Eldorado, "The Master Drawing Pencil," to Joseph Dixon Crucible Co., Pencil Dept. 167-J, Jersey City, New Jersey.

CODE FOR THE RATING OF LOW PRESSURE HEATING BOILERS

Adopted by the Steel Heating Boiler Institute, December 10, 1929

1. The purpose of this code is to provide a uniform method of rating Low Pressure Heating Boilers.
2. The rating of a boiler shall be expressed as square feet of steam or water radiation or as B.T.U. per hour.
3. For purposes of this Code, boilers are divided into two general classes as follows:
   - A. Steam and Water Boilers in which solid fuel, hand fired, is used as the heat generating medium.
   - B. Steam and Water Boilers in which solid fuel, mechanically fired, oil or gas is used as the heat generating medium.
4. The rating of a boiler in Class A, expressed in square feet of steam radiation, shall be not more than fourteen times the heating surface of that boiler in square feet.
5. The grate area of a boiler for the rating as determined by Section 4 shall be not less than that determined by the following formulae:

   For boilers with ratings 300 sq. ft. to 4,000 sq. ft. of steam radiation;

$$\text{Grate Area} = \sqrt{\frac{\text{Catalogue Rating (in sq. ft. Steam Radiation)} - 200}{25.5}}$$

   For boilers with ratings of 4,000 sq. ft. of steam radiation and larger;

$$\text{Grate Area} = \sqrt{\frac{\text{Catalogue Rating (in sq. ft. Steam Radiation)} - 1500}{16.8}}$$

6. The rating of a boiler in Class B, expressed in square feet of steam radiation, shall be not more than seventeen times the heating surface of that boiler in square feet.
7. The furnace volume of a boiler (as defined in Section 10) for the rating (as determined by Section 6) shall be not less than one cubic foot for every one hundred and forty square feet of steam rating.
8. Boilers selected on the basis of this Code shall be connected to stack and breeching in accordance with the manufacturer's specifications.
9. The rating as defined above for purposes of selection is intended to correspond to the estimated design load, which is to be the sum of items A, B and C.
   - A. The estimated normal heat emission of the connected radiation required to heat the building as determined by accepted practice, expressed in square feet of radiation or in B.T.U. per hour.
   - B. The estimated maximum heat required by water heaters or other apparatus connected to the boiler, expressed in square feet of radiation or in B.T.U. per hour.
   - C. The estimated heat emission of piping connecting radiation and other apparatus to the boiler, expressed in square feet of radiation or in B.T.U. per hour.
10. Definitions:

    For purposes of this Code the following definitions will be used:
   - A. One square foot of steam radiation shall be considered equal to the emission of 240 B.T.U. per hour and one square foot of water radiation shall be considered equal to the emission of 150 B.T.U. per hour.
   - B. Heating surface shall be expressed in square feet and include those surfaces in the boiler which are exposed to products of combustion on one side and water on the other. The outer surface of tubes shall be used.
   - C. Grate area shall be considered as the area of the grate surface expressed in square feet and measured in the plane of the top surface of the grate. For double grate boilers the grate area shall be considered as the area of the upper grate plus ¼ of the area of the lower grate.
   - D. Furnace volume shall be considered as the cubical content of the furnace between the top of the base or the normal grate line and the plane of entry into or between the tubes plus the net base volume under the firebox. The net base volume shall be determined by deducting the volume of the refractory lining from the gross base volume under the firebox.

THE GROWTH OF THE SPECIFICATION

(Continued from page 151, Editorial Section)

and the development of new materials it is not hard for the most casual observer to recognize the debt we owe to the chemist in the development of what today are absolute essentials to good building, notably waterproofings, cement hardeners, floorings, paints, varnishes, stains, and an innumerable list of other materials.

The latest and one of the most important developments in the specification is the new standard specification of the New York Building Congress which has recently been issued to the architectural profession, after several years of most careful preparation. It is as yet a new idea and not thoroughly understood, but in my opinion it is eventually going to be universally adopted by the architects. But like every new idea it will take a little time for it to sink in.

PERSONALS

(Continued from page 152, Editorial Section)

CLARK J. LAWRENCE has moved from Palm Beach, Florida, to 11 East Huron Street, Chicago, Ill.

VICTOR MAYPER has moved his offices from 15 East 40th Street to 110 West 40th Street, New York, N. Y.

SAMUEL NAPP, formerly located at 15 East 40th Street, has moved to 110 West 40th Street, New York, N. Y.

ABNER E. FOSTER, ARCHITECT, formerly associated with Bernard Pepinsky in the Enquirer Bldg., has opened an office at 605 Provident Bank Bldg., Cincinnati, Ohio.

ROBERT J. TORRENS, consulting engineer, has opened an office in the Shubert Bldg., St. Paul, Minnesota, for the practice of engineering.